

BASIC PRINCIPLES OF DRAWING

Art X 5

BY
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PART I

UNIVERSITY OF CALIFORNIA-UNIVERSITY EXTENSION
Department of Correspondence Instruction
BERKELEY, CALIFORNIA

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BASIC PRINCIPLES OF DRAWING

Part I · Assignment 1

Introduction

Drawing is a natural means for the expression and communication of ideas. It is especially useful for the expression of ideas which may be visualized, or which may be symbolized in terms of see-able objects. The use of this eye language is almost universal during the years of childhood, and it would be more generally understood among adults if its practice were not soon interrupted as children grow up. Other apparently more urgent interests intervene, and except for the fortunate child whose parents encourage him to continue such practice, the eye-language gradually loses its meaning.

When adults learn to draw they are taking up again the practice of a skill which began to develop with their first childish scrawls. If they had continued the practice of drawing, mind and hand would have developed together, but now the hand's ability to execute is far behind the mind's ability to visualize. The adult must often practice painfully the execution of comparatively simple forms until his hand-expression becomes fluent. Until this ability develops, the adult, whose mind is now mature, is as critical of his own hand-ability as he would be of a child's drawing. He is apt to become impatient with himself, and to fall into the belief that only especially talented people can learn to draw. He will say ruefully, "I can't even draw a straight line!"

It is true that there are some people with more natural aptitudes than others for painting and drawing. It is also true that such native ability seldom exhibits itself until the talented individual has undergone a certain amount of discipline and training, whether under the supervision of a teacher or not. Most often a strong desire to draw is the first indication of special talent. Such a desire usually induces the individual to practice drawing. Schools may aid him, but the desire to draw and the determination to practice it to the best of his ability and upon every opportunity is the real basis for his development.

Putting aside any ideas of special talent or genius, it is sufficient to know that any normally equipped person may learn to express himself acceptably by means of drawing if he will apply himself patiently to the mastering of its fundamental principles, and continually practice their application. It may be said that the time and effort required are no greater than those needed to acquire proficiency in a foreign language. Indeed, the rewards for even a slight degree of proficiency in drawing are apt to appear sooner.

Just as speech and written language have many specialized uses, so skill in drawing and painting may serve many concerns other than art for its own sake. Drawing and painting may, like poetry, concern themselves solely with the rhythmic and effective expression of lofty ideas. But they may also serve the needs of any business or science which makes use of diagrams, illustrations, or visual symbols. Here also, composition, that side of visual art that concerns itself with the proper placement of the elements of one form or several forms in rhythmic, spatial, and pattern relations, is an intrinsic part of any effective expression through drawing, for a drawing and the shape of the area upon which it appears, the format, must always be considered as an organic unity, a whole with its parts in relation.

Turn the pages of any publication and you will see reproduced the work of numerous artists and designers, whose specialties are all founded upon and derived from the basic principles of drawing and composition. Any commercial artist or designer will tell you that the ability to draw is prerequisite to success in his trade. Many such men continue the study of drawing and composition long after their financial success is assured.

Now that the importance of drawing as a basis for the practice of visual art in any form is understood, let us begin to draw, remembering that patience, courage, determination, and ordinary common sense are the most important items of our equipment.

But beyond these, we will need:

12 x 18 inch tablet of white drawing paper, similar to the kind known as manila,
2B pencil,
soft rubber eraser,

pointed watercolor brush, small, about size No. 8, pan or tube of Charcoal Grey watercolor. (Ivory Black will do if Charcoal Grey is not obtainable.)

The proper way to arrange your drawing pad in relation to yourself and to your subject matter.

When you place your drawing paper before you for work, arrange it so that it is parallel to your face and directly in front of you. It should be far enough from your eyes so that you are able to see the whole sheet at once without moving your head. On a larger sheet of paper than your 18 x 12 inch pad, you might have to walk back and away from your drawing in order to see the whole sheet, and to judge the effects of your drawing as a whole. That is why artists use special supports called easels. But a table or desk, or even one's own lap, is sufficient support for making drawings of comparatively small size. The usual procedure is to work with the eyes at least as far from the paper as the length of the diagonal of the sheet. Drawing students, in their earnestness and in the execution of some relatively unimportant detail, often strain their eyes by bringing their faces very close to the paper. Such a practice precludes proper attention to compositional relations, which depend upon a constant awareness of the relations of the lines within the format of the picture to the lines of the shape of the format. In doing this they lose sight entirely of the whole effect of the drawing, which is much more important than any of the details. It must be remembered that the drawing must be most effective at the distance from which it will ordinarily be viewed by an observer.

Of course it is permissible, after the main parts are laid out, to view details of the drawing more closely at times; but it is better to cultivate the habit of working as far away from your drawing as possible. This will prevent you from loading it with detail which is not needed for the total effect, and--last but certainly not least--will keep you fully conscious of the vertical and horizontal lines of the paper upon which you are working. If you have a straight line to draw, it is much easier to compare it to one of the straight lines of the format while you are drawing it. This habit of constant comparison of the lines which limit the format with the lines you are placing within will prove increasingly important as your work progresses, so you had better begin to form it now. It is important as an aid in developing a sense of composition, of the relation of all the parts to each other and to the shape of the whole area within which you are working.

When you begin to draw with a subject before you, you will be instructed as to how to place this subject with reference to yourself and your paper. For the lessons where you are engaged in setting down ideas which are in your mind, rather than in taking them from some subject matter before your eyes, it is sufficient to remember to keep the horizontal of the sheet parallel to a line through your eyes: that is, facing you in such a manner that you can comfortably look directly at the center of the paper; and to keep the sheet at least as far from your face as the length of its own diagonal.

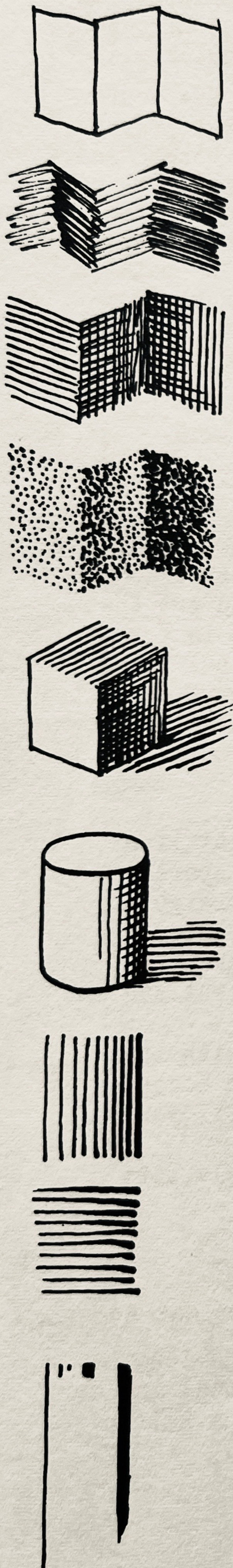
Lines and Spots

Drawing materials vary according to the purposes for which the drawing is intended, and according to their convenience for producing this or that effect.

Your 2B pencil will make lines when properly sharpened. You will find a square of fine sandpaper useful for dressing the point of the pencil. With a pencil of this soft grade, do not attempt to keep the point very sharp; something about halfway between the thickness of the lead and the sharpest point possible will be best. Harder pencils with sharper points are useful to mechanical draughtsmen, but for freehand work we need a more responsive lead. You will work with a rounded point on your pencil. The pressure should be just sufficient to make a firm, clear line, and not so great as to dent the surface of your pad paper to any appreciable degree. Don't dig in your lines so that they cannot be erased.

Your pencil will, of course, serve to fill in areas solidly if you use it in such a manner that all its strokes overlap each other; but it is not the most convenient nor efficient tool for such work. The brush and paint are best for making spots or planes, whereas the pencil, being sharp-pointed, is best for making lines. Artists speak of their tools as media. You are working with paper, pencil, eraser: this is the pencil medium. A given artistic medium has a given range of effects which are legitimate and best in that medium. Pencils and pens make lines most easily, so pencil and pen drawing are referred to as line media. The artist, when using a pencil with a fairly sharp point, tends to use it only for making lines, and if

he wishes to fill in areas so as to give the effect of tones, he most often does so with a pattern of lines close enough together to fuse in the eye and to stand for a tone or value. He does not scrub the paper with the pencil or pen. Such effects are left to drawings in value, where fewer lines appear and most of the expression is in terms of various spots and planes of grey which create lines where they meet.



The effects obtainable by the use of crayons and sticks of charcoal stand somewhere between the pure line media at one extreme, and the pure value media at the other. In the latter the artist uses the large brush full of paint, which cannot conveniently draw a line around an object, but which can put down a spot or plane of paint of a given darkness or lightness known as a value.

If you will look at the walls of the room in which you are sitting, you will see that the edges or points of difference between the various plane surfaces which make up your room come to your eye chiefly as differences between dark and light, or darker grey and lighter grey.

Strictly speaking, there are no lines in nature as we see it. For a line, strictly speaking, has no thickness. Those lines we see are actually the edges of planes of color. They are the places where one color meets another, where one surface quality changes suddenly to another surface quality, or where one texture meets another. They are also created by sharp variations in degree of illumination. Lines appear at the edges of sharp shadows. Sometimes they are not clearly defined and we call them "soft" lines. When they are clear, and sharp differences occur, we refer to them as "hard" lines. Often the change from shadow to light takes place so gradually that no definite line of demarcation, or point of difference, appears at all. We call such an effect a gradation. A gradation may appear between two planes of different degrees of darkness or lightness, or value. Or the value difference may occur suddenly, creating the effect of a line.

The lines we draw with a pencil do have thickness, although the ones we observe in the natural world do not. If we use our pencil in such a way that the length of the line is much more important than its thickness, our eyes tend to disregard the thickness and accept the effect of line. But if a drawn line is too short for its width, it becomes a plane in its own right, rather than the edge of a plane or spot. When the thickness of the drawn line becomes unnecessarily important, it interferes with the clarity of expression of our intention, i.e., with the efficiency of our drawing as the expression of an idea. We should never use more of the medium than we need to express a given effect. This is one of the basic principles of successful artistic expression.

A drawn line need only be thick enough and dark enough to be clearly visible at the distance from which the drawing is to be seen. Any thickening of the line beyond this will be used to convey special meanings and effects. These we will discuss later.

It is now time to practice using your tools.

Directions:

Use your paper with the long side vertical unless otherwise instructed by text or illustration.

Have a number of sheets of paper devoted solely to practice drawing. After you have practiced sufficiently to execute the problem with some degree of confidence and fluency, prepare one sheet of your pad as evidence of your mastery and understanding of the problem.

BASIC PRINCIPLES OF DRAWING

The exercises which should appear on this sheet, after you have practiced them, are as follows:

Exercise (a). Practice in controlling lines drawn freehand (without a ruler).

Set down two points about an inch and a half apart horizontally (parallel with or equidistant from the bottom of your sheet of paper), and attempt to connect them with one straight line drawn quickly.

Draw from the elbow, not with the finger tips only. Use your entire arm, all the way to the shoulder. You will find that if your hand travels too slowly, the line will waver. If, on the other hand, you attempt to scrawl too quickly, you will miss the second point entirely. Practice for control and fluency. If the points seem too far apart, begin practice with points closer together, slowly lengthening the distance until you can draw a fairly straight line between them without hesitation. Try raising the point of the pencil from the paper to practice the gesture of the straight line with the point in the air. Then lower the point and try drawing the line between the points with the same gesture.

Exercise (b). Practice the same exercise with vertical lines.

Exercise (c). Practice the same exercise with diagonal or oblique lines (about 45° from the horizontal).

Practice all these lines in two ways, drawing them away from your body and towards your body. You will probably find that drawing the lines away from you will be easier at first. When you put the results of your practice on the sheet which you will send in for correction, indicate which direction you have used. Your final sheet should show at least a dozen lines drawn in each of the ways described above. Of course you will practice them all before putting them down on your assignment sheet.

Exercise (d). Practice in controlling freehand curves.

Set down three points not in a straight line. Let them be about an inch and a half apart. Start with points not far from the straight line, and as you practice, move the center point further and further from the straight line which might occur between the first and last points.

Practice drawing curves which begin with the first point, run smoothly through the second and end on the third. Keep at it until you can draw a smooth, fluent curve.

Practice curves which are approximately part of a circle.

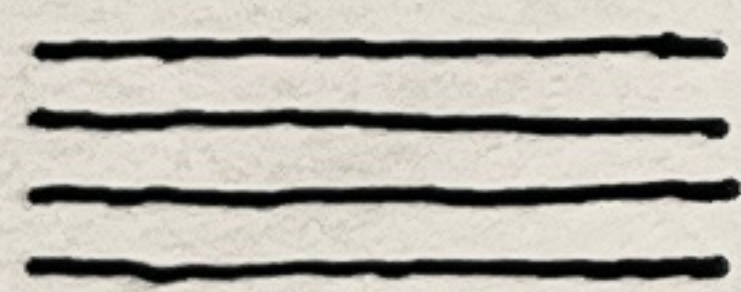
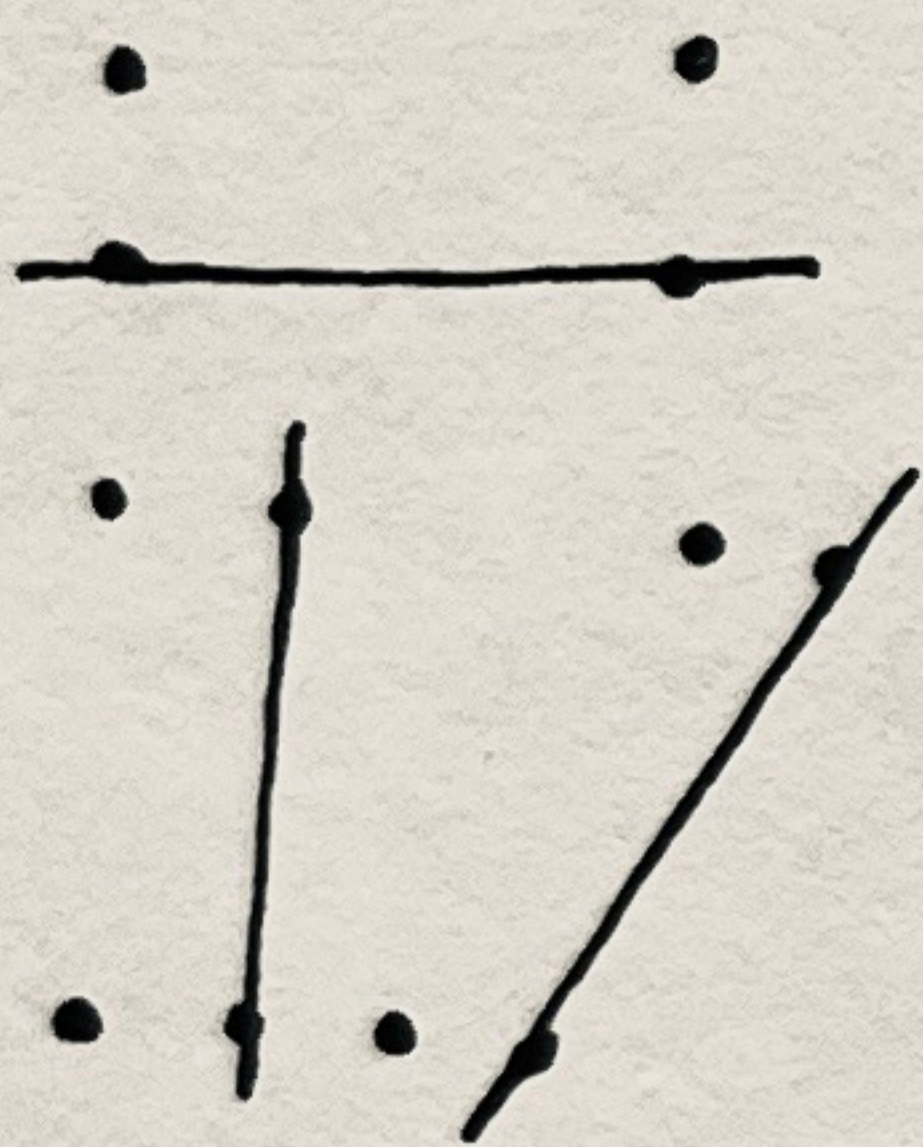
Exercise (e). Practice curves which are parts of ellipses.

Exercise (f). Construct a nine-value scale as follows. Do not stipple.

Draw, as best you can, nine squares in a long row the long way of your paper. Try to keep them in line with the horizontal and vertical of your paper. Make the squares about an inch and a half high. Now number them from one to nine.



*Line thickened
here stands
for shadow.*



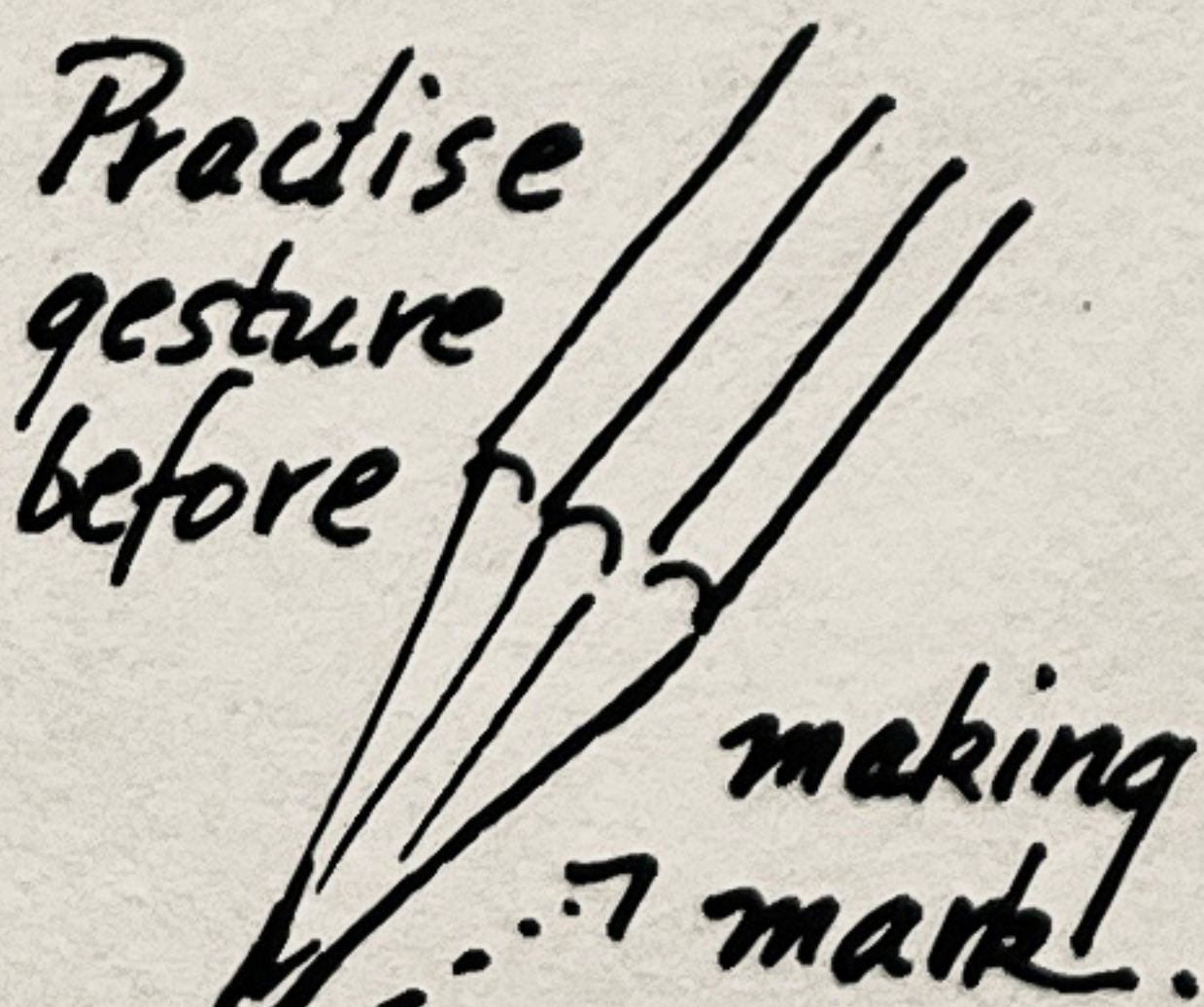
Too quick



Too slow



Points too far apart.



Take your brush and watercolor and provide a crockery or enamel plate on which to work out your brush and color, and a bowl of water. A piece of soft cloth will be useful for wiping, and a blotter may come in handy for picking up excess pools of paint.

Wet the brush and take up sufficient pigment upon it to make a solid black stroke, no more, no less. Fill in square number 9 with the black watercolor. When it dries it may not be quite even or quite black. This means that you did not mix your paint evenly with the water, or that you used too much water. To lay an even wash of transparent color takes some practice and skill.

It is best to begin with a stroke across the top of the area to be covered, enough color being on the brush to puddle slightly at the lower edge. Each succeeding stroke is placed lower, parallel to the last, in such a way that the puddle from the first stroke flows down a little into the second. This makes the entire area fairly even in value. If a light value is desired more water is used; for a dark value, less water is used.

After some experiment and practice fill in square 5 with a value which seems to you to stand exactly half way in lightness and darkness between the lightness of the paper and the blackness of square 9. Now fill in square 7 with a value which seems to your eye to stand evenly between 5 and 9. Now do square 3 with a lighter value (more water) which stands between paper color and the value of 5.

Complete this ladder of values from black to the white of the paper by filling in the halfway points each time. You will first do 9, then 5, then 7 and 3; then 2, 4, 6, 8, leaving 1 untouched to stand for white. When finished you should have a row of nine squares which grade in even steps from paper white to black. This is a value scale.

Practice making value scales until you succeed in getting one which is even in its stepping from white to black.

Exercise (g). The value scale in pencil.

Take up your pencil again, and with the painted value scale before you, try matching the values 3, 5, 7, and 9 by means of parallel vertical lines. Do not let the lines touch each other but lay them close together, not much more than the thickness of one line apart.

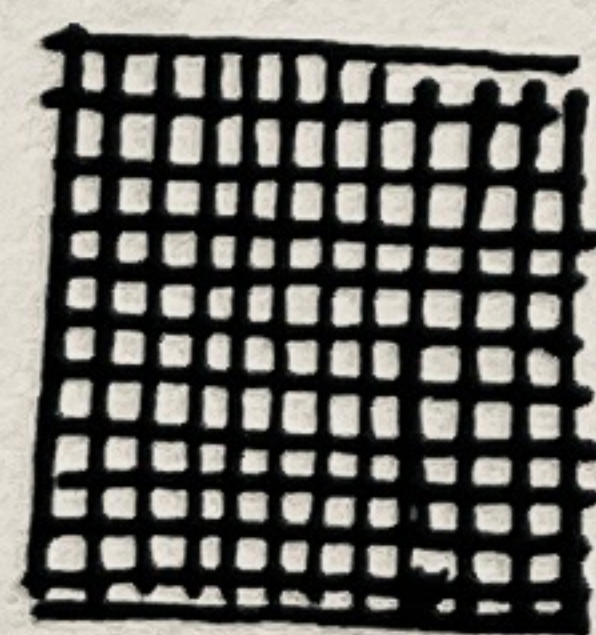
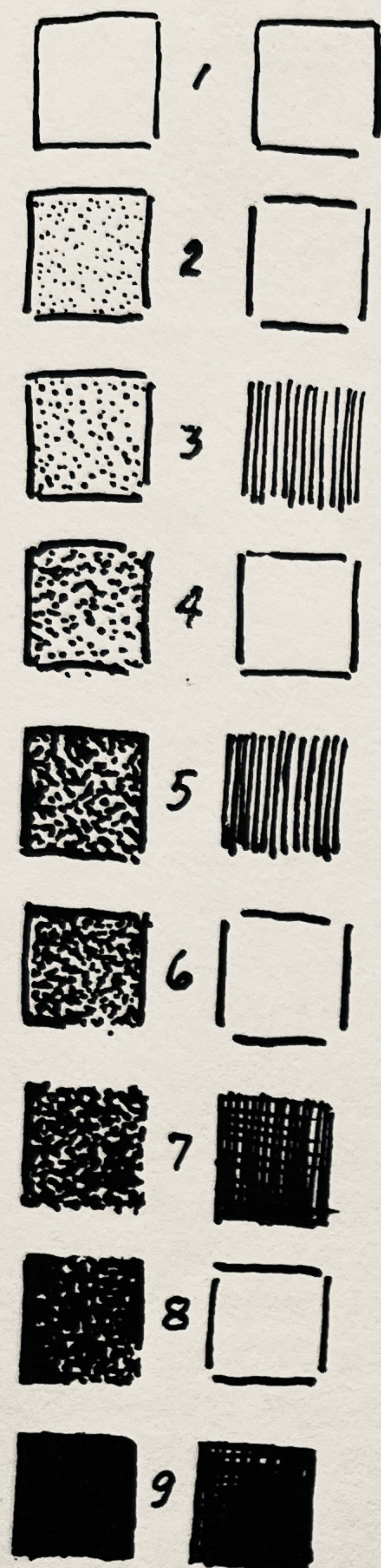
You will find that it is harder to control the evenness of values produced in this way. They are actually assemblages of lines which blend in the eye to give the effect of value.

The lines which make up these values give a directional quality to the surfaces on which they lie. They form a texture which has a strong directional quality. The painted values, on the other hand, do not have this characteristic.

Exercise (h). Now try a series of squares to match 3, 5, 7, and 9, but this time use criss-cross vertical and horizontal lines.

This effect is known as "cross-hatching," and is used to express areas in line drawings where the forms are veiled by deep shadow, as well as to express certain sorts of texture. You will find it hard to achieve a cross-hatch light enough, just as in the previous exercise it was difficult with parallel lines to get a dark enough value.

This difficulty leads to the necessity of simplifying the value scale in line drawings to the utmost. A five value scale usually represents the limits of value expression in line work. Very often only three values are used.

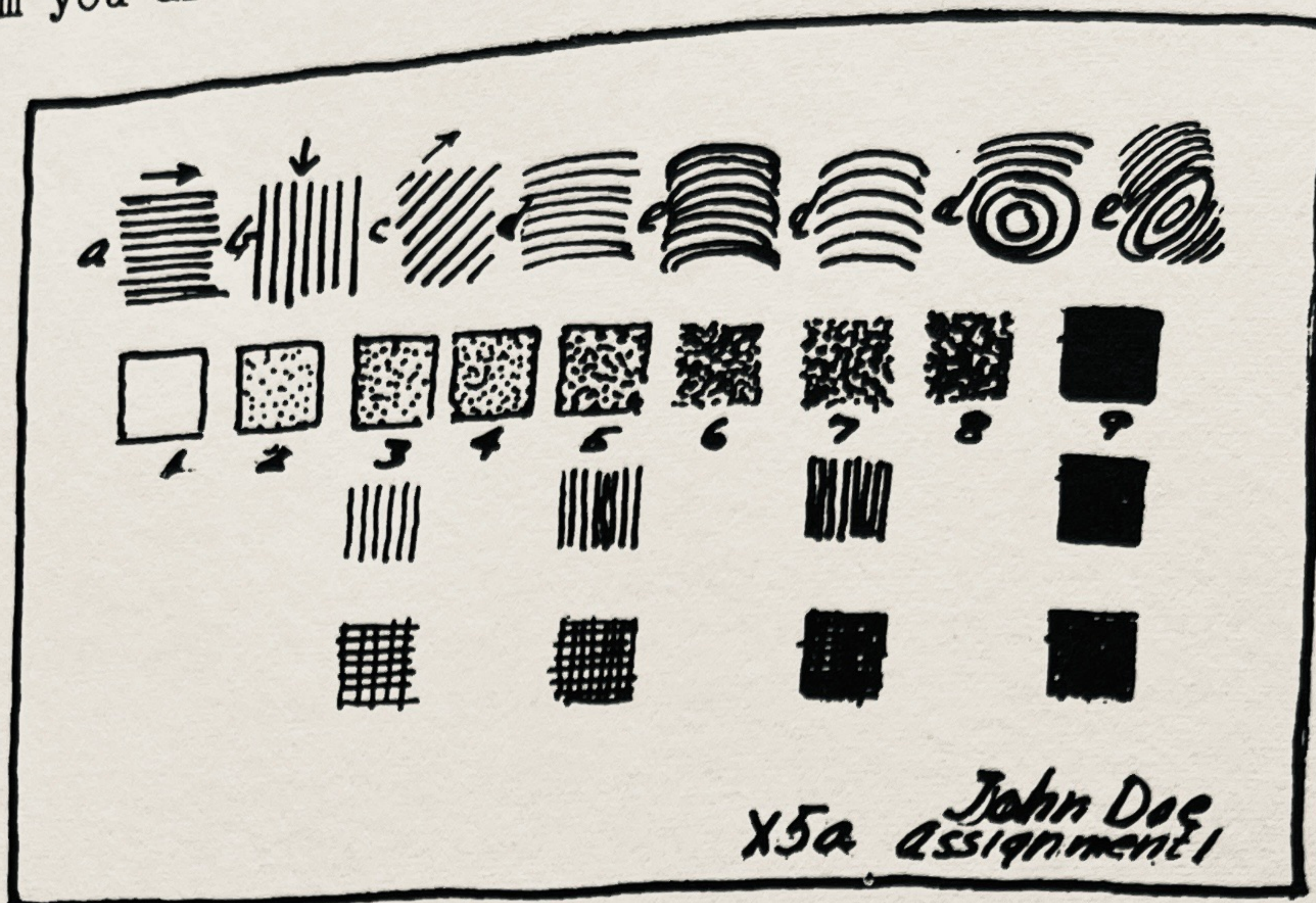


BASIC PRINCIPLES OF DRAWING

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Your first assignment to turn in will look something like this diagram. Remember that you should spend several hours time in practice before you attempt to turn in an assignment. Be sure to label each part of each assignment sheet so that the person who corrects them may be sure just which problem you are solving in a given drawing.

Note: The watercolor wash will be represented in these instructions by stipple



Layout

Be sure to arrange your squares and the other separate parts of your exercise so that they make a good layout. The term layout is used to refer to the first, superficial, two-dimensional plan of the parts of the drawing assignment which are to appear on one page. A good layout is a two-dimensional, or pattern composition, in which order in the form of balance across the center of the format is the first concern. This is a balance of attention-drawing spots--interesting or contrasty places in the material on the page. The parts should be so arranged within the format, the picture area, that they do not seem to lead the eye out of any of the edges or corners, and so that they do seem to relate to each other more closely than to anything outside the format. The separations between the parts should express, by their dimensions, the degree of separation in idea or meaning of the several exercises. Like should be grouped with like, and the spaces between groups of drawings should not be larger than the spaces between any one drawing and the edge of the format. Usually it should be less. A little more space should be allowed at the bottom than at either the sides or top, because a drawing too closely related to the bottom of a sheet often seems to be about to drop off the paper. Lines and spots of pigment have a kind of visual weight. The various visual weights should balance across the optical center of your format, which center will be somewhat above the actual measured middle. The average weight of your forms should seem to be neither above, below, nor to one side or the other of the optical center.

Some set of simply related proportions should be adopted for the spaces separating the various parts of your layout. Let us say that your smallest separation might be one quarter inch. Then let the next be twice that, or 1/2 inch and the next largest twice 1/2 inch or one inch. This will produce a rhythmic sequence of proportions among the various separating spaces between the parts of your layout. If all the divisions are based on multiples of 1/4 inch, you will sense an order and rhythm in looking at them, though you may not actually measure them to discover just what the relation is. Care in such proportioning will develop in you a sensitivity to the spaces between and around objects, which are equally important in art with the volumes and proportions of the objects themselves.

These common-sense compositional requirements must be attended to in every assignment sheet you hand in. All professionals are exceedingly careful about the presentation of their work, for a bad presentation will often prevent otherwise good work from receiving the notice that is its due. You do not want the eye of the observer of your work to wander off the format. This is an elementary principle of composition. The design must have inner balance and coherence--a tendency to stick together visually--which is usually called unity. Later on when you are introduced to compositions in depth, or third dimension, you must apply the same ideas of relative proportion to the depth effects. As your drawing progresses you will learn more and more about the important effects which the lines of your format may have upon the lines within it, and the effects which these lines may have on each other. The relations between the parts are as important as the parts themselves.

Part I · Assignment 2

Introduction

In the first assignment we practiced hand control and manipulation of the pencil and the brush, so that we might make on the paper lines or spots of pigment which would carry out our ideas. Until we develop a degree of control over our artistic medium, it is impossible for us to express any ideas clearly. We have found that some artistic media can do some things for us better than others: the pencil makes lines best, the brush fills out spots or planes best. Of course the brush may be used to make lines also, but only if we are drawing upon a much larger scale. Later we shall try brush drawing on a larger scale, and use the brush to make lines which, although thick, will be sufficiently elongated to serve as lines to the eye.

There is a very good reason for mastering line technic first, however, for it is most often of use to artists who work for reproduction; that is, who execute designs for printing in books or papers. The beginning sketches for any work of art whatever are most often begun in line.

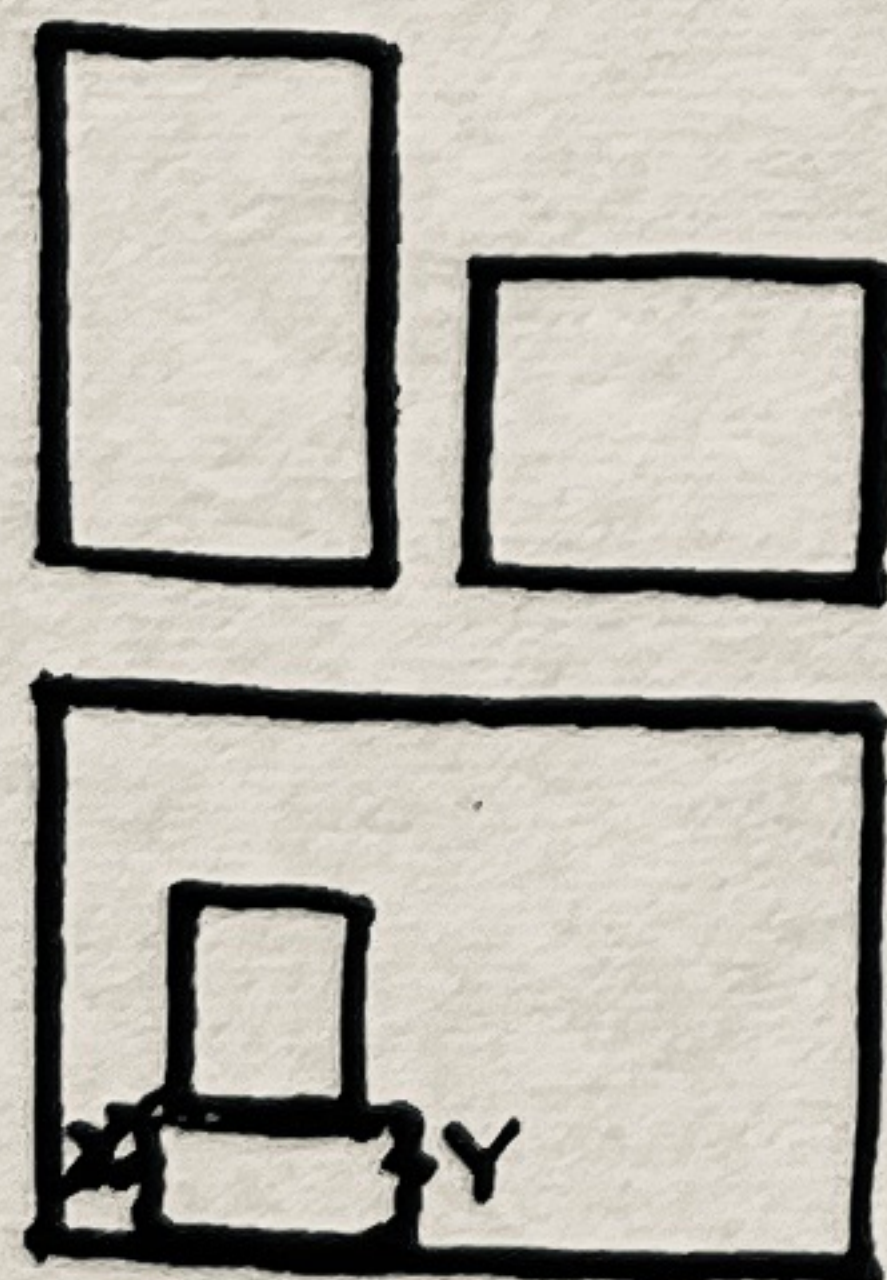
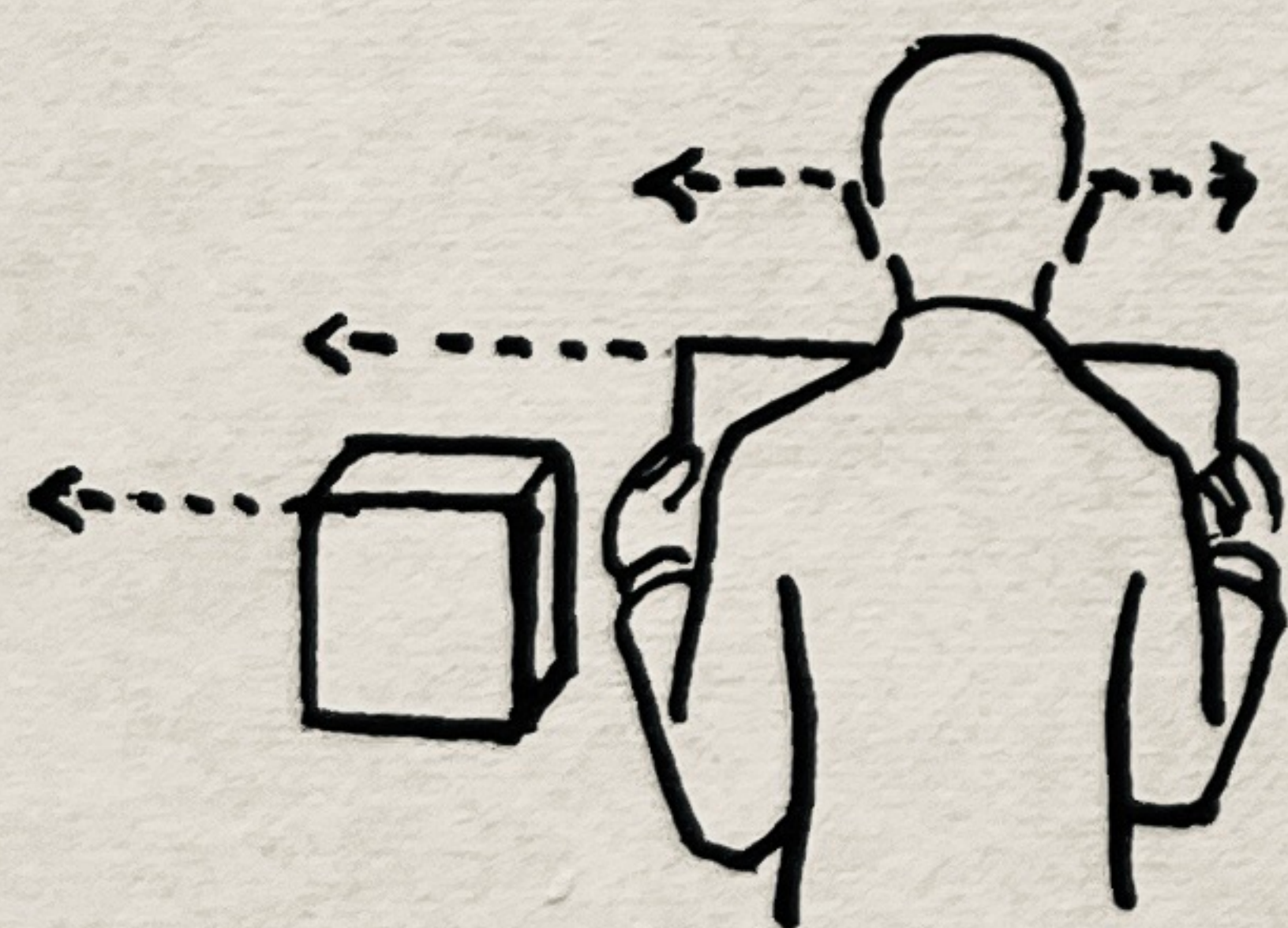
We have learned to make lines vertical, horizontal, diagonal, curved in various ways; and to create values, or degrees of lightness or darkness, by the use of lines placed close together, and by the use of planes of light or dark grey done with a brush. Already we know how to express this part of what we see; but as a small boy is supposed to have said: "Drawing is thinking a think and drawing a line around it." So far the only "think" around which we have drawn a line is the square shape we used for our value study.

A "think" is an idea. We know how to represent the ideas of vertical and horizontal and to combine these ideas into something which presents to our minds the idea of a square.

We have also practiced diagonal lines. Now let us combine them with the lines which make the square. We have said that diagonal lines may often convey ideas of depth or space. They seem to lead the mind's eye away from or toward the flat surface of the paper. With our squares and our diagonal lines we should now be able to begin to represent the idea of a solid, three-dimensional object,--an object in space.

Of course, there are innumerable objects which suggest such complicated ideas that at present you are unable to visualize them, to see them in the mind's eye. But if you will close your eyes and concentrate, you will be able to visualize such a comparatively simple object as a box.

Exercise (a). First steps in space drawing.



$x = y$

Think about a box you have seen. Think of it as below you and a little to the left, so that you can see its top and side as well as front. It need not be a square box, but the front, which is facing you as you think about it, is rectangular and parallel with your face.

With the idea of such a box in your mind, seat yourself and arrange your drawing pad before you as previously directed. Is there anything about this sheet which reminds you of your box? Yes, it too has a rectangular shape, like the front of the box. The horizontal position of the paper corresponds to the horizontal of the box front. The vertical of the paper corresponds to the vertical of the box front.

Now think about a comparison between the height and breadth of your box front. Is it higher than it is wide? How does it differ from the rectangle of your paper?

Draw a line parallel with the bottom of your paper which will stand for the bottom of your box. Think of the height of the box while you draw, so that the line for the base will not be too long to allow room on the paper for the line you must draw for the height. You will not draw a line that is really as long as the bottom horizontal of the box you are imagining. You will only draw a line that will stand for it on your paper. It must agree in horizontality, but not in length.

Now erect the vertical which stands for the side of the box you are thinking of. If the box is higher than it is wide, make this vertical line longer than the horizontal line. Try to get the relative lengths of the two lines true to the idea of the box. Keep thinking about your idea, and make the drawing correspond to it as closely as possible in proportion. That is, your lines will not actually be as long as lines measured on the front of the box, but they will be similar in relation to each other, and in proportion to each other.

Now finish up the lines around the front of the box of which you are thinking. The top line will be parallel with the bottom line, and the two verticals will be parallel with each other. If you have difficulty with these lines, remember the advice in the first assignment about putting down dots to act as guides for your lines. Do not try to draw an uncomfortably long line in one swift stroke as yet. Move from dot to dot. Keep trying, through several sketches, to perfect the expression of the idea of this rectangle which you have imagined, and draw only the last one on your assignment sheet. Don't start on your final copy of the assignment sheet until you have practiced each part of this assignment.

Several important ideas have been introduced in the execution of this rectangle. First you imagined it, and then you put down lines which re-presented your idea in terms of the medium of pencil lines on paper. You found that the horizontal of the paper corresponded with the horizontal of your imagination, and the vertical of the paper corresponded with the vertical of your imagination. Although your paper was not big enough to allow you to draw the box actual size, you were able to re-present it by lines which were in the same proportion to each other as were the lines of your imagined box front. You could not "copy" the box size; you could only re-present it, on a smaller scale. But you could copy the verticality and horizontality.

All of these words will come up again and again in further assignments. Be sure you know just what they mean.

Exercise (b). Left and right hand space direction.

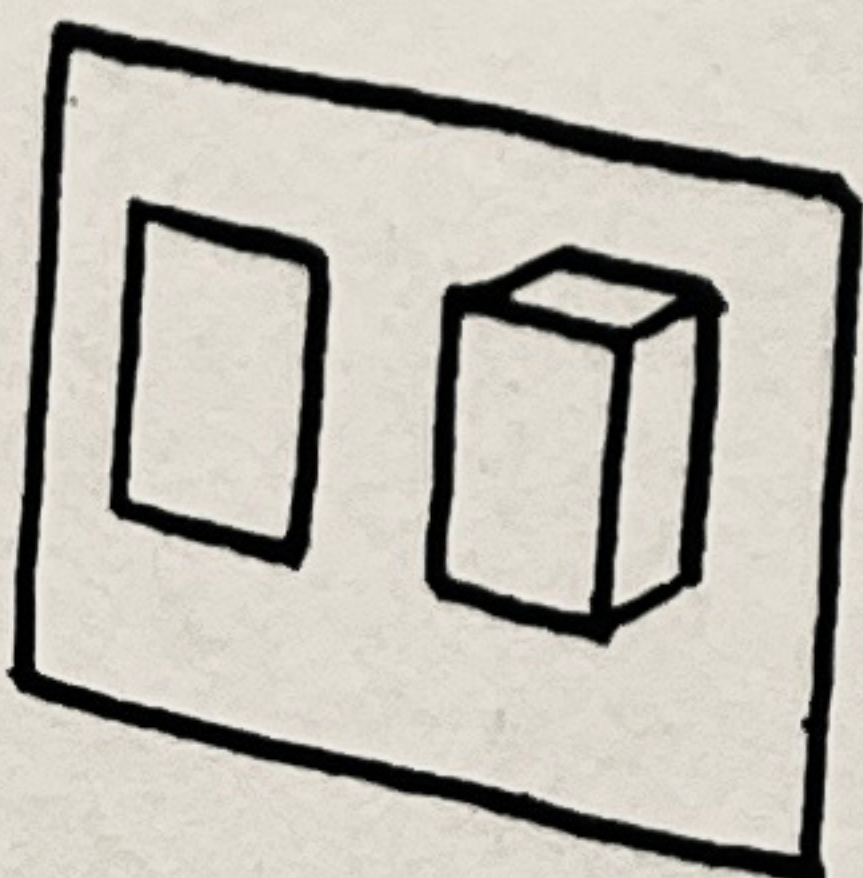
We have succeeded in representing the front of our imagined box, but we have not yet represented its depth. So far we have only a plane on a flat surface.

Now make another drawing of your box front, this time being sure to leave room on the paper for other lines which will be attached to it.

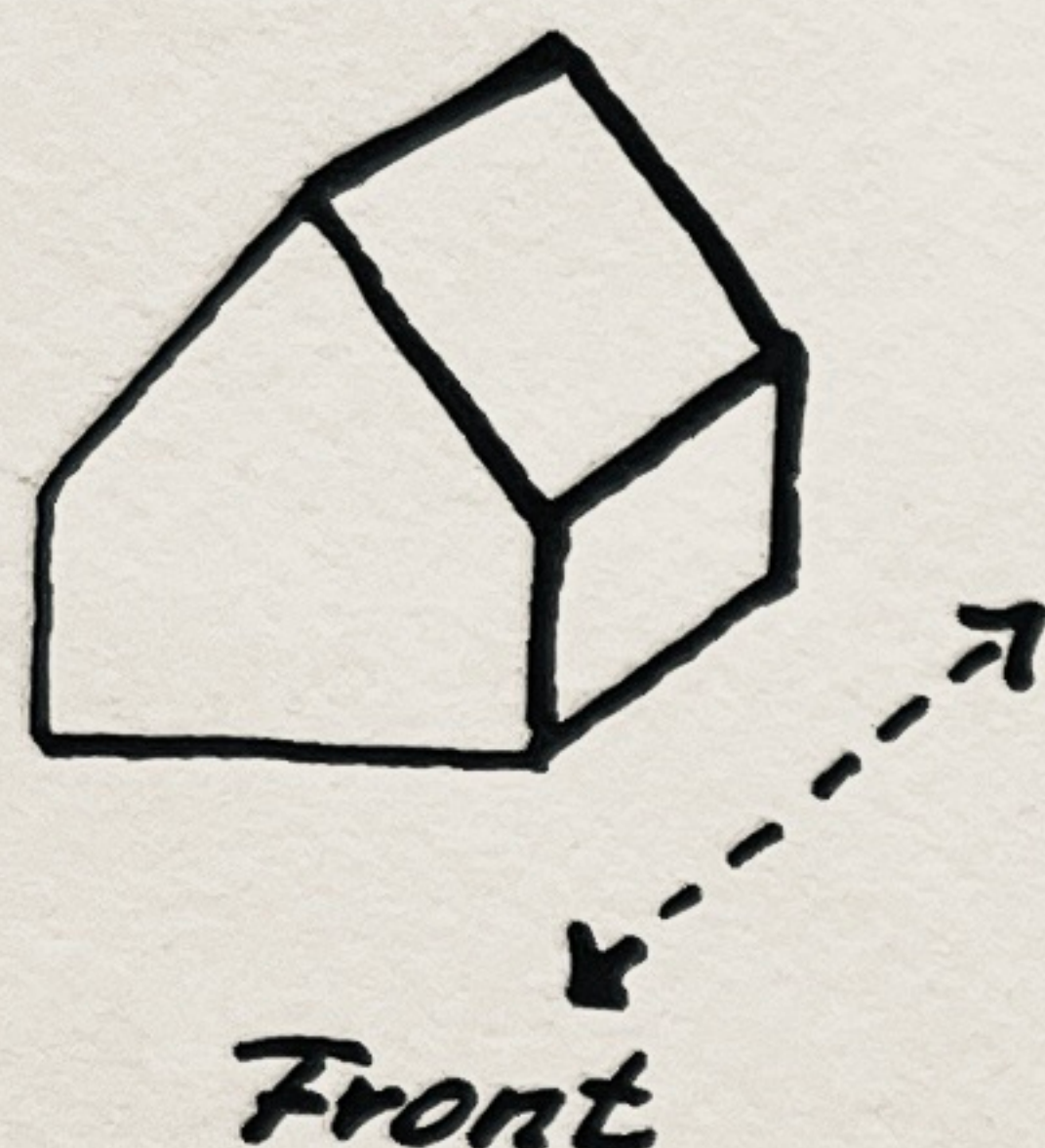
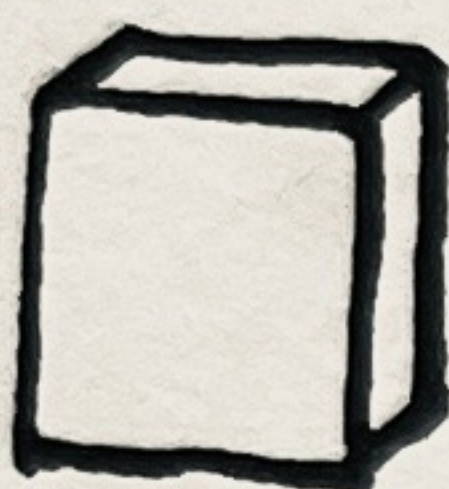
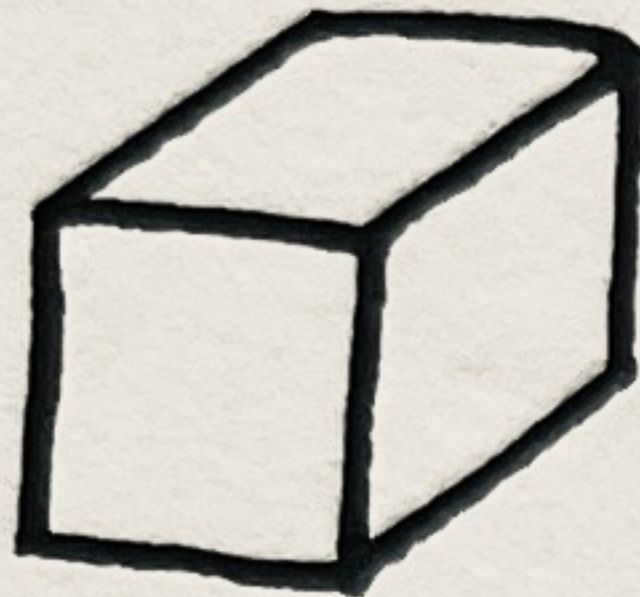
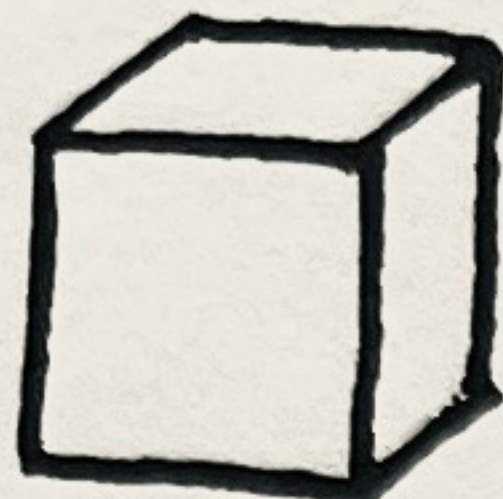
You were asked to think about a box of which you could see the top and one side. This means that it must be below the level of your eye, either to right or to left of you. For our explanation here we shall concentrate on the left hand view. We say that our box is in left hand space, or in the space which lies to the left of the observer.

Now arrange your pad before you as directed and try to think of your box, with its front parallel to you, in left hand space. Think of the side of the box which you can see. Are all its lines either vertical or horizontal? Of course we know that they really are if the box is truly rectangular, but in this view, from your position, do they appear so?

At this point you may have to reinforce your imagination by looking at some real object which is rectangular, parallel with you, below your eye and to your left. You will find, at any rate, that one vertical line of the side of the box is the same line as one vertical of the front. Look out of the window at some rectangular object such as a house, which is in left hand space relative to you. Trace on the glass the direction of the line which goes away from you, the bottom line of the side of the house. You will find that it appears as a diagonal on the window.



Now return to your paper and place a diagonal line on your drawing of the box front, connecting with the lower right hand corner. How long should this line be? How deep is the box you are imagining? You must lengthen this diagonal until it seems to you to represent the amount of depth which you have in mind for your box. Again you will find that this line cannot be the actual depth of the box, but that it may present the idea of the depth by being in proper proportion to the lines of the box front.



Now draw the top of the box by drawing two more diagonals of the same length, connecting their ends with lines drawn parallel with the top and sides of the front. Draw your final box front with sides and top added, on your assignment sheet.

You have now succeeded in expressing in drawing one of the most important simple conceptions of form: the idea of a solid object. Later we shall vary the shapes of our boxes and stack them together to represent all sorts of things, and we shall come to be much more particular about the exact angles which our diagonal lines make with the vertical and horizontal. It is sufficient at present to be able to re-present the idea of any rectangular solid form at all. You are already on a level with the early Egyptian artists in ability to represent solid objects.

Exercise (c). Left hand space: further examples.

Now try several sketches of your box in left hand space below eye level, varying the angles of the diagonals with the verticals. At first keep all the diagonals in any one box parallel. You will find that if the diagonals are near to the horizontal, the box will appear to be in a position near to eye level. If the diagonals are nearer to the vertical, the box will appear to be seen more from above.

You will find that if you allow the diagonals to vary from the parallel relation, your box will no longer express the idea of a rectangular solid; or in some particular cases it will represent a rectangular solid which is very much longer in depth than the box of your idea. This will occur if you allow all the diagonals to converge perceptibly toward a single point. If they do converge a little, but not perceptibly: that is, if you must measure them to find out that they are not actually parallel with each other, they will not distort your box.

The details of these matters will be taken up later under the topics of foreshortening and perspective. They become more important as we begin drawing larger objects in deeper space. For the present we need to gain fluency by drawing many small boxes, and objects which may be represented by boxes in combination.

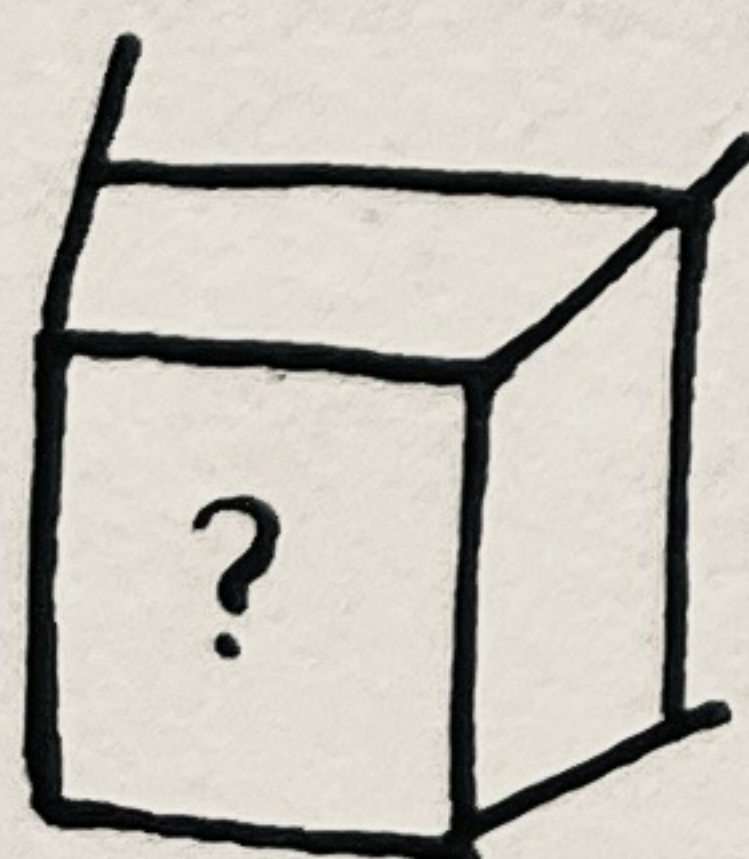
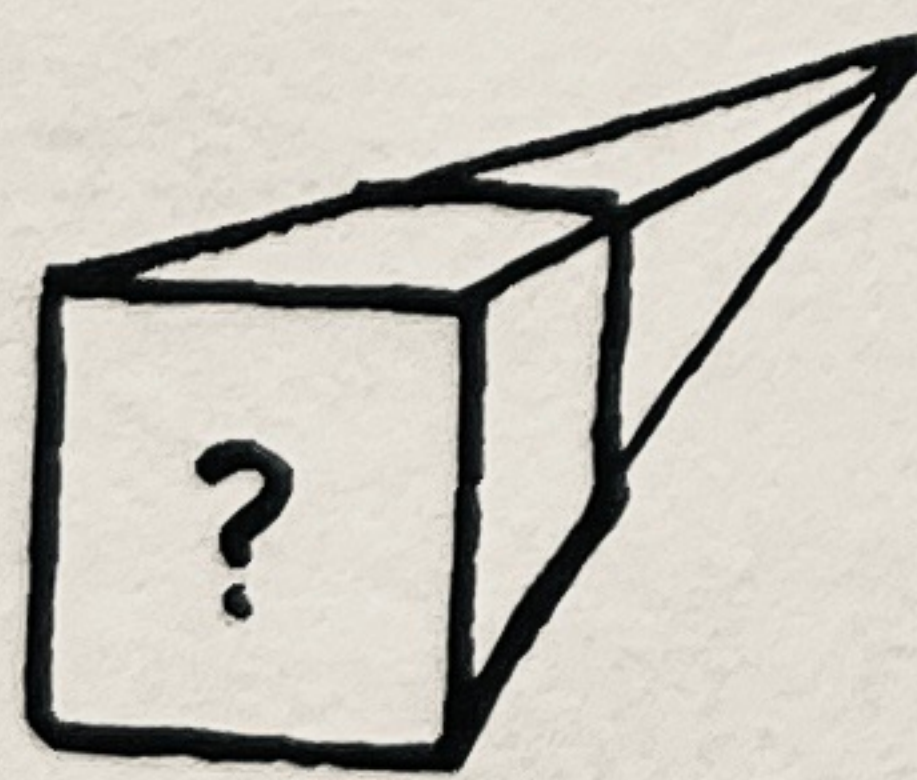
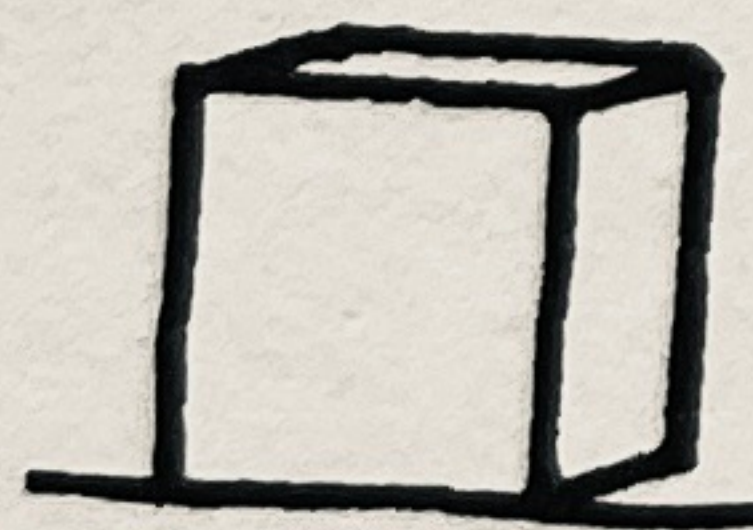
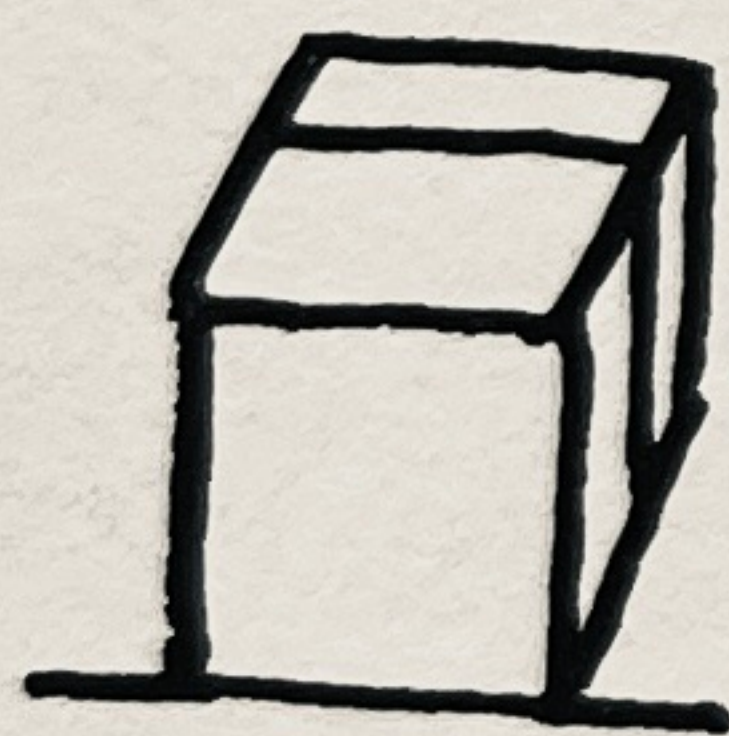
Draw on your assignment sheet a box seen from high up, another just below eye level, and one in which you have converged the diagonals sharply to a single point.

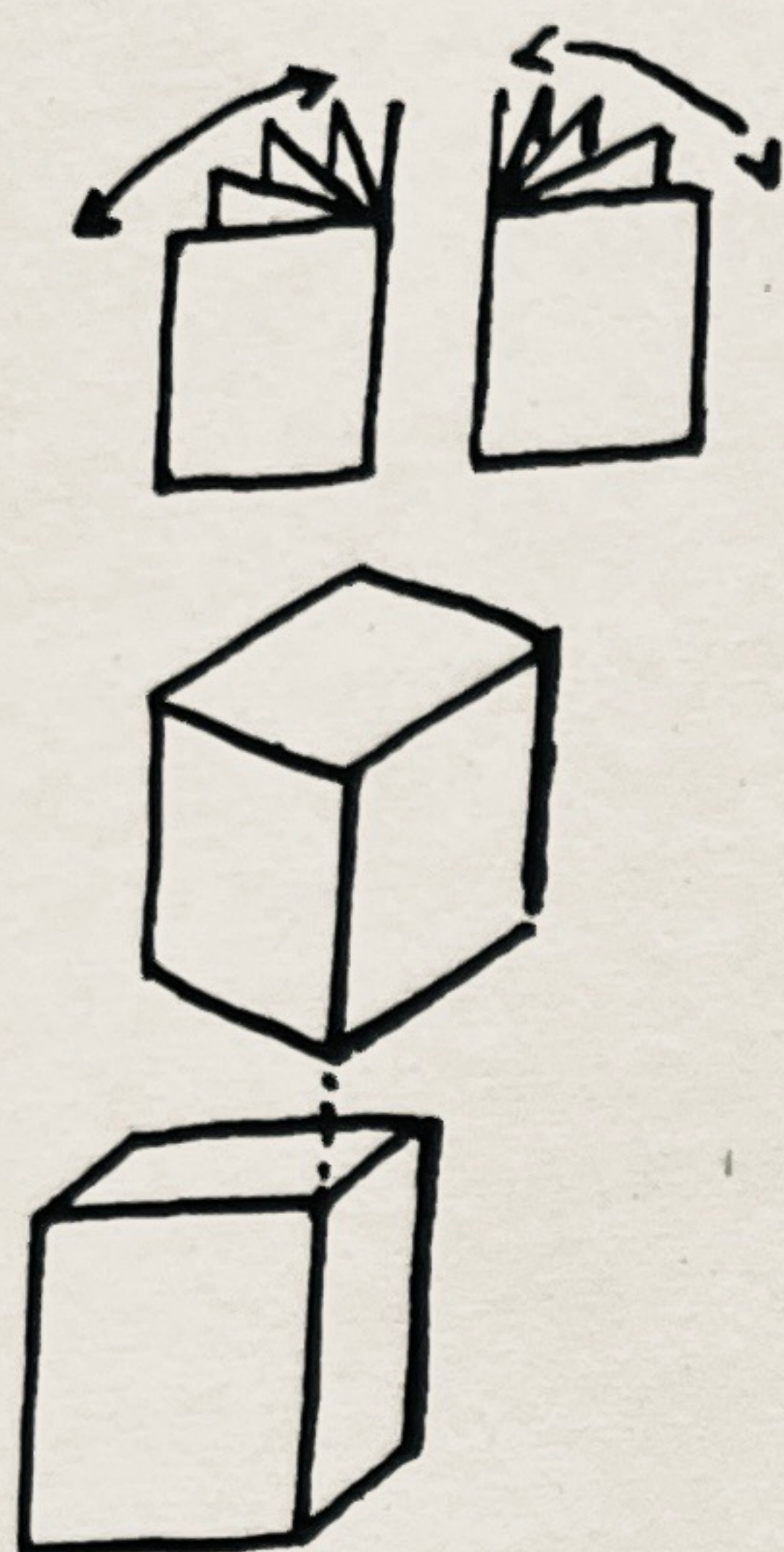
Since doubtless you are getting very tired of boxes which sit stiffly at attention parallel with your face, let us now consider the matter of tipping and turning them.

Exercise (d). Tipping and turning forms.

Draw your box front as before, without the side and top. Now imagine the box as below your eye and rotated away from you. To see what happens, take a small rectangle of cardboard--a calling card will do--and hold it in front of you, below you, parallel with your face, and perpendicular with some level surface such as a table top. Keeping the card still vertical, rotate it sideways a little. It will swing away from you like a door. You will notice that the lines which have been horizontal now appear to you as diagonals. The card now looks like you. Notice that the vertical line further away from you is higher than the near one, and that both top and bottom lines are diagonals.

Remembering these appearances, apply them to the box which you are drawing from imagination.



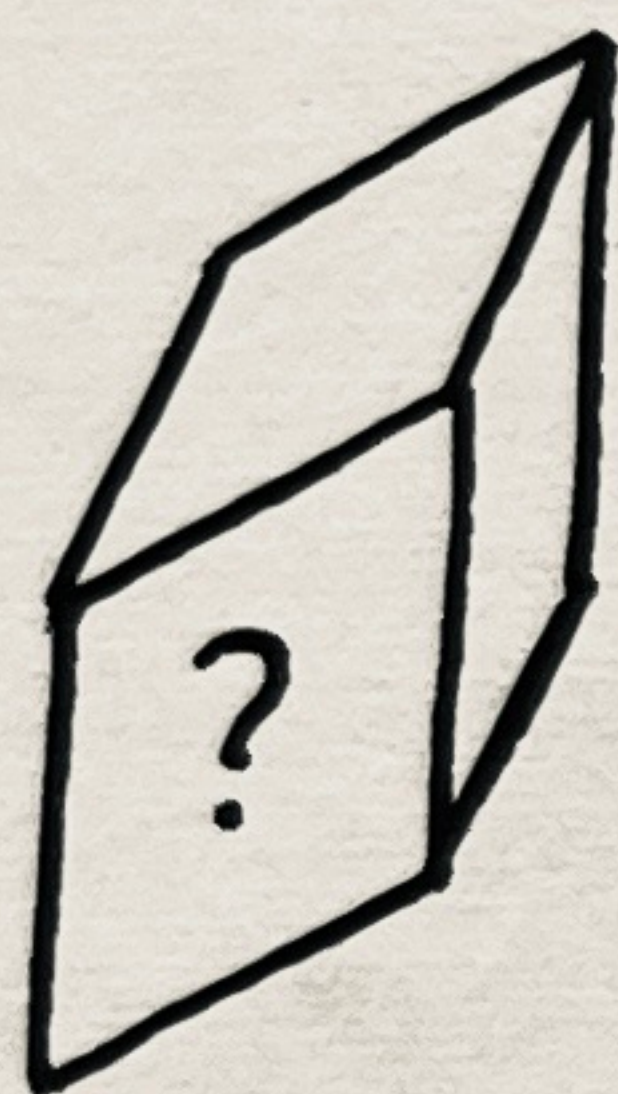


Draw your box as if it were in front of you, below you, perpendicular with the floor or table top, but with its front no longer parallel with your face, since it has been rotated away from you. The verticals of the box will still agree with those of the paper, but the horizontals of the original box front will have become diagonals on your paper. The diagonals of the side of the box will still be diagonals, but will have changed position. You must experiment to find the degree of diagonality which produces the right effect. There is no safe way but that of judging through your eyes. The question you must ask yourself constantly is, "Does it still look like my box, or have I pushed the box out of shape in attempting to rotate it?" If you succeed in getting just the right combination of acute and obtuse angles, they will convey to the mind's eye the idea of a rectangular solid form. They will stand for the right angles which they represent. But in the wrong combination or relation this will not be true.

Draw two of these rotated boxes on your assignment sheet.

Exercise (e). Tipping and turning forms (cont.).

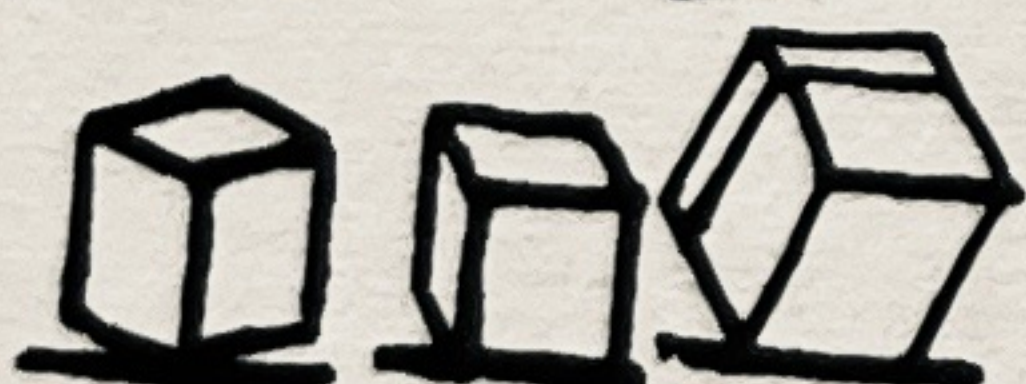
Let us now move from the realm of imagined objects to the world of real ones.



Arrange yourself and your drawing pad at the end of a table, and place at the other end a rectangular box. (A shoe box or something similar will do very well.) The box should be at least three times its greatest length distant from your eyes as you draw. In fact, at this stage of your work, the farther away the better. Place this box parallel with the top and bottom lines of your drawing pad and parallel with a line through your eyes, so that it appears directly in front of you.

Your task is simplified because some of the lines of the box correspond to the verticals and horizontals of your paper shape. This correspondence between elements drawn and the lines of the paper is important. Plan to devote half of your assignment sheet to this drawing.

Draw in the vertical and horizontal lines of the front of the box. You will notice that the side lines of the top are neither horizontal nor vertical, but diagonal. Try to estimate the angles between these lines and the horizontals and verticals. If you have the box placed directly in front of you, parallel with and somewhat below your eyes, you will find that the angle on the right side is the same as that on the left. Now place guiding dots for these diagonal lines, and the horizontal at the back which connects them.



Leave out any details which may appear on the surface of the box. You are now drawing in only the lines which describe its fundamental shape: its essential form. Pay no attention to any shadows or lettering or ornament; these are subordinate characteristics of the real box, and for the present we are indifferent to any but essential forms.

You now have a rectangular shape drawn. Its front face, outlined by vertical and horizontal lines, seems to lie parallel with the surface of the paper, and with the face of anyone observing the paper.

However, the top of the box, with diagonal lines connecting the parallel lines marking its front and back, conveys another idea. The diagonals inform the observer that the sides of the box move back from him into space. The back parallel line appears shorter than the front one because the diagonals are apparently converging as they move away.

Angular Measurement

For estimating the acute angles of the box top, there is a device which the untrained imagination finds useful.

Take two straight edges, such as two rulers or pieces of cardboard. Hold them together at one end, and separate the other ends to form an angle between the two edges. Now hold this angle formed by the two rulers between you and the box which you are observing. Move one straight edge until it corresponds to the horizontal top line of the box front. Adjust the other to correspond to the line of the top which goes away from you: the diagonal. The angle so formed will agree fairly accurately with the angle you are seeing. Put the angular arrangement of the rulers down upon the surface of your paper so that the horizontal one corresponds to the horizontal line drawn there. Place dots to indicate the position of the diagonal line, put aside your rulers and draw it in.

You now have one of the acute angles which form the box top. You should be able to construct the other one without measuring it. Just make it as much like the first one as you can, and draw in the back horizontal of the top, which will appear higher up on the paper and somewhat shorter.

How much higher? How much shorter?

We see by picking up the box and handling it and perhaps measuring it with the ruler, that this back line is not really shorter, but that it only appears so to the eye when it is in that particular position. This brings up a question which has troubled artists a good deal. Are we not conveying an untruth when we draw the back of the box top shorter than the front?

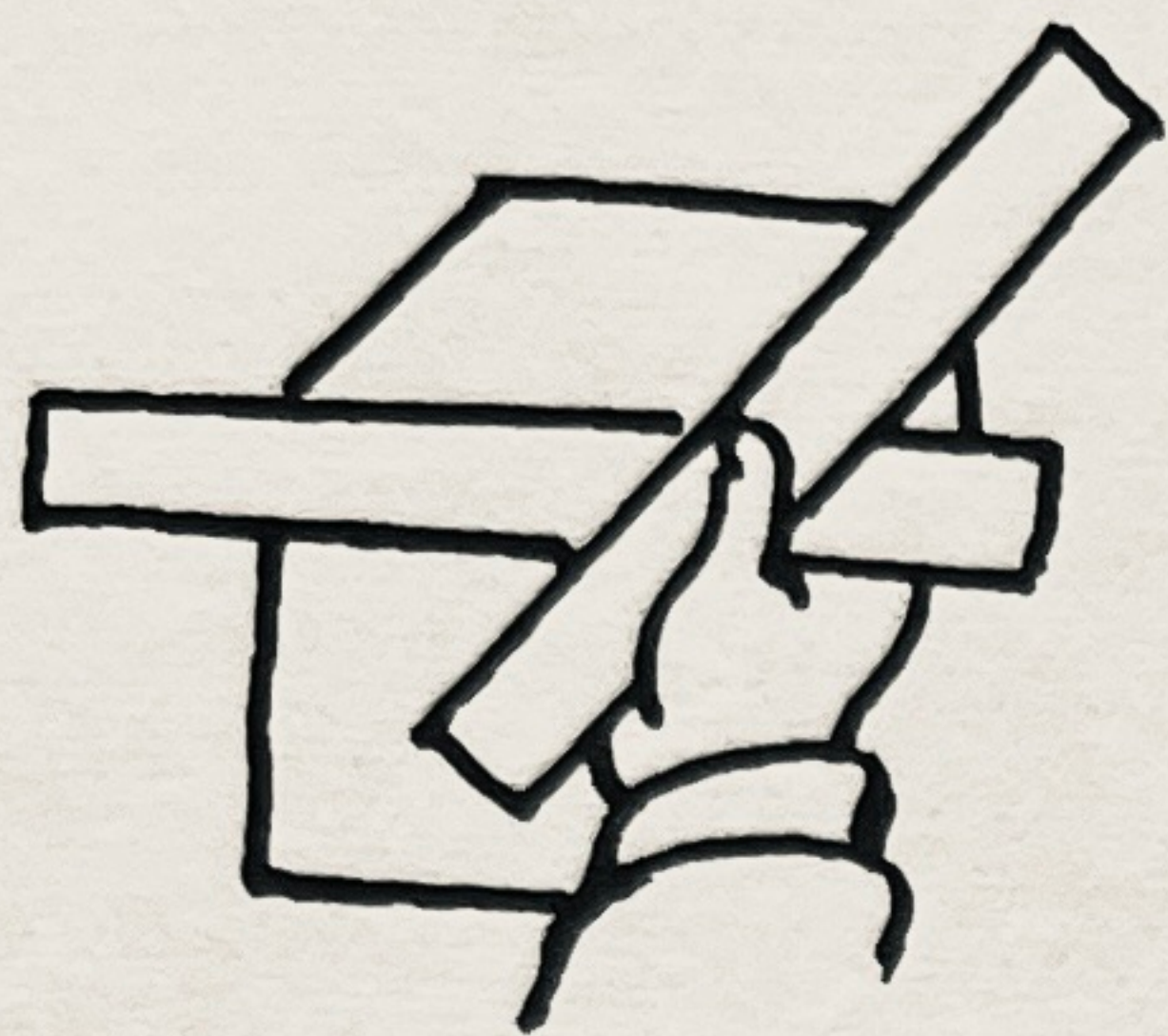
In drawing, as in other media of expression, the artist must decide among various truths which he might convey, emphasizing the one most important to him at that particular time and place, while more or less subordinating other truths to it.

A mode of drawing does exist in which equal dimensions of a subject appear as measured equals in the drawing. This is called mechanical, or architectural drawing, and is chiefly used by architects, draftsmen, and other makers of plans for the guidance of workmen. The plan of your box would be drawn as if you were looking at it directly from above. The front elevation would be the front plane alone, as if the box were facing you and on a level with your eye.

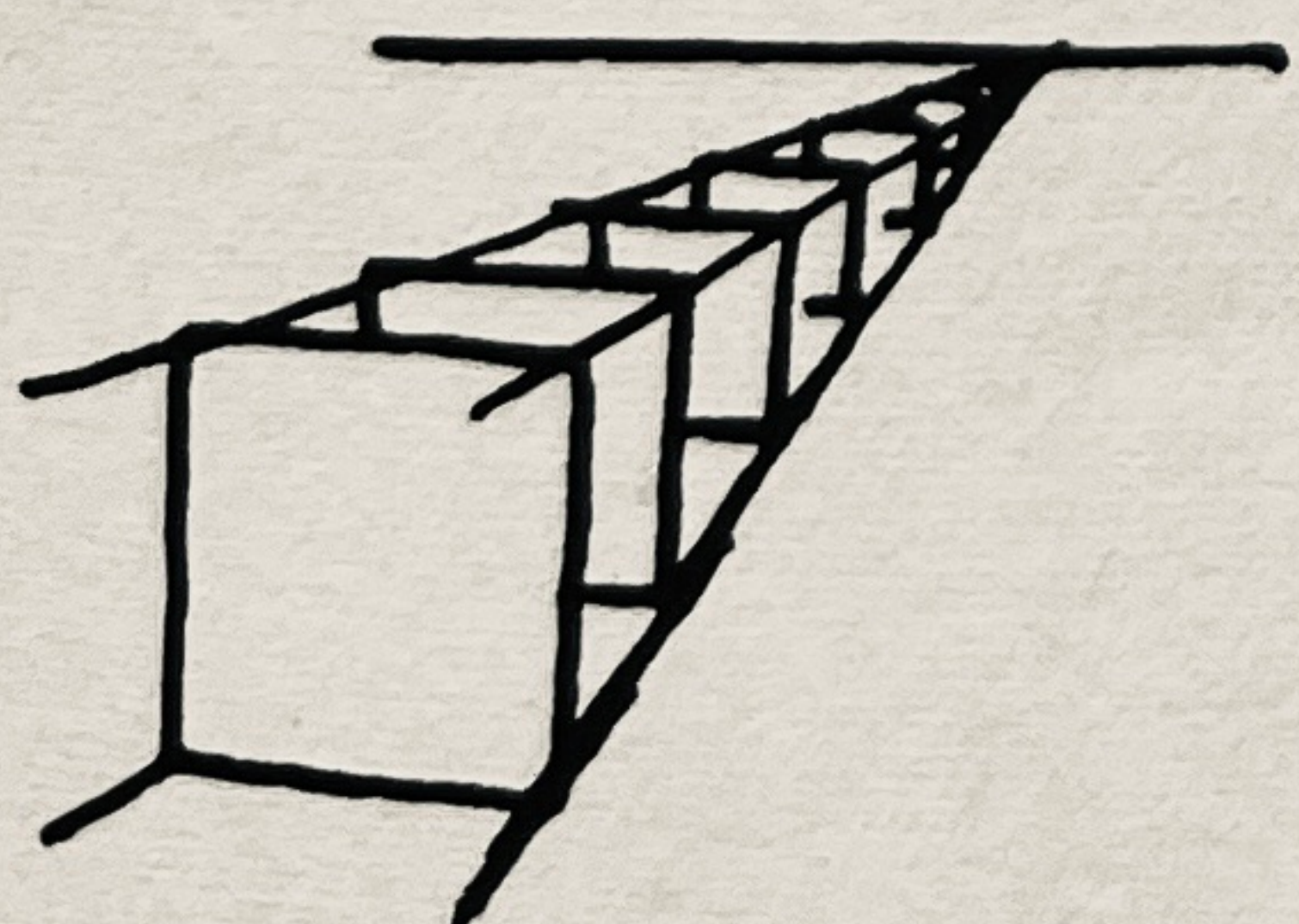
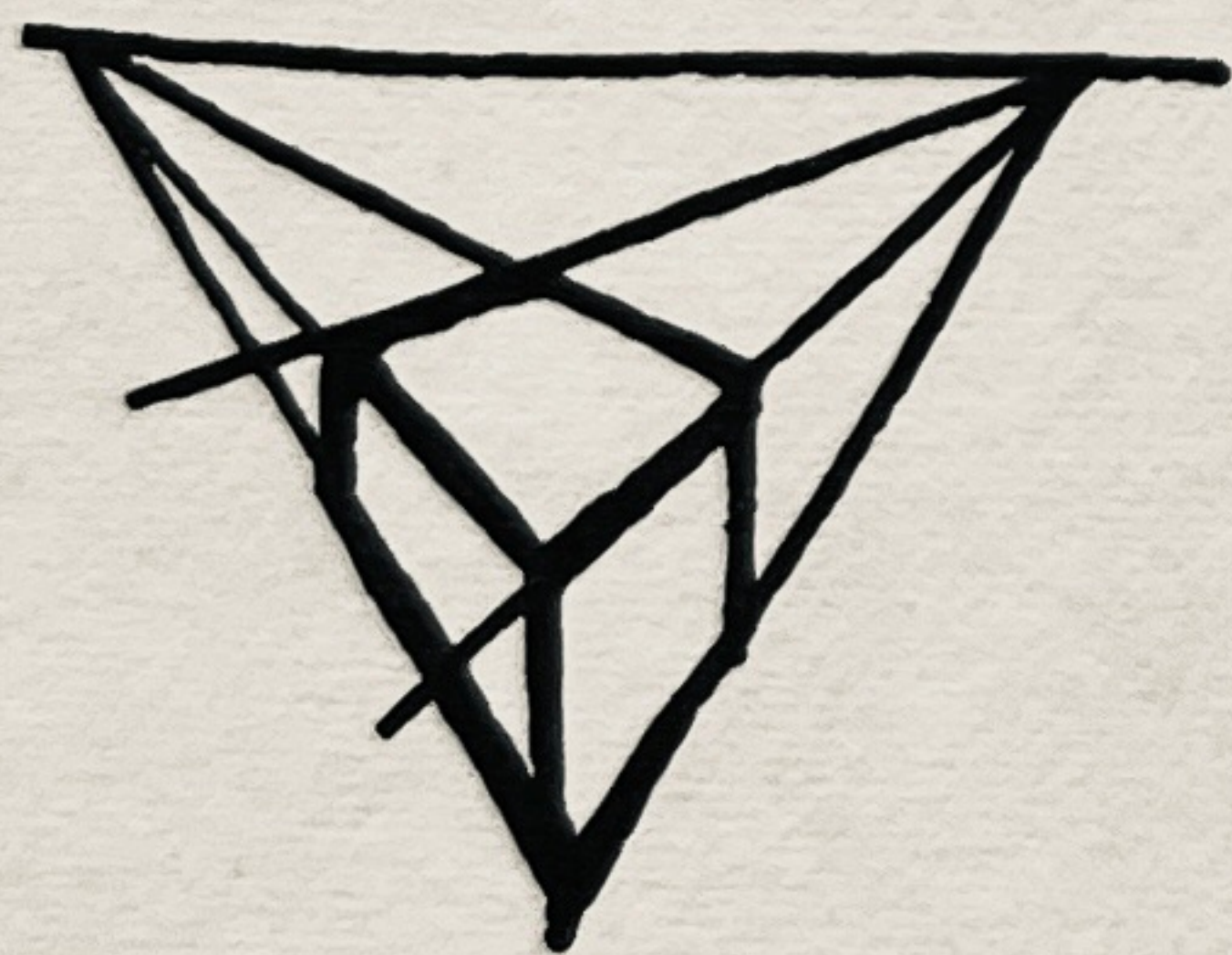
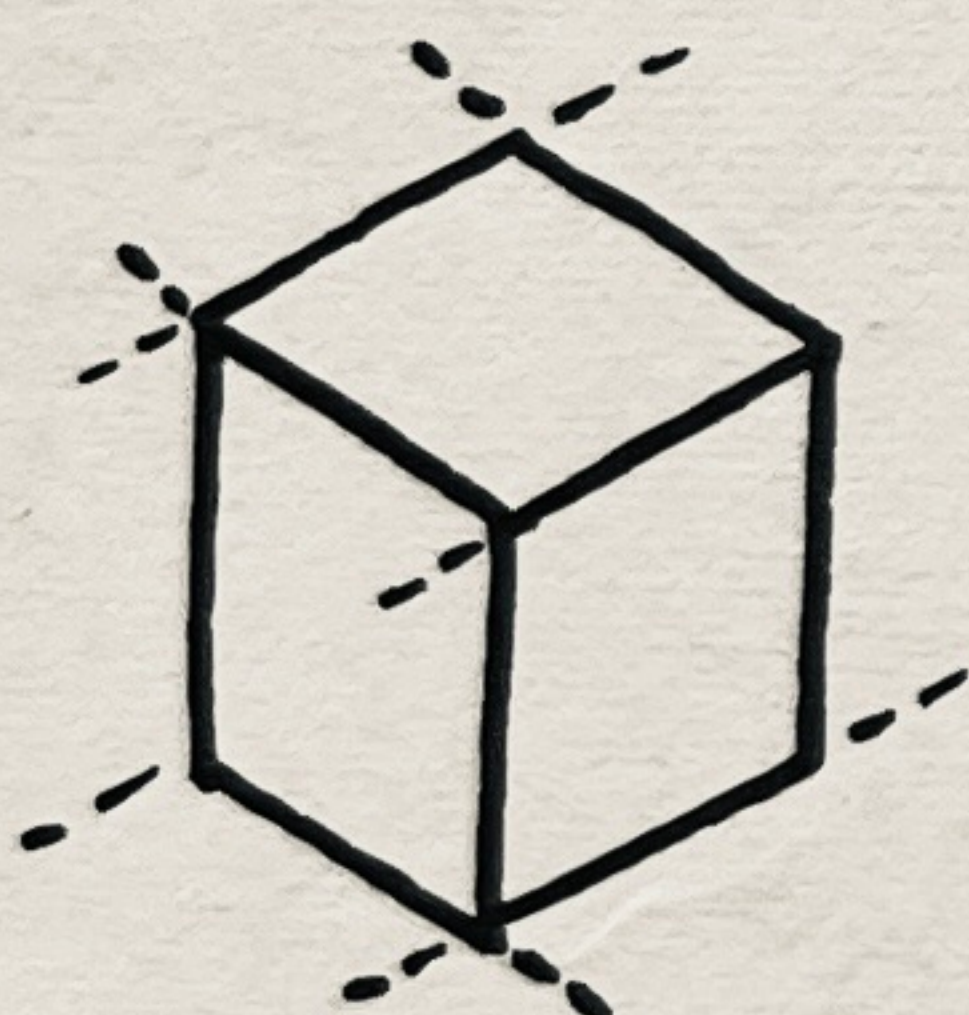
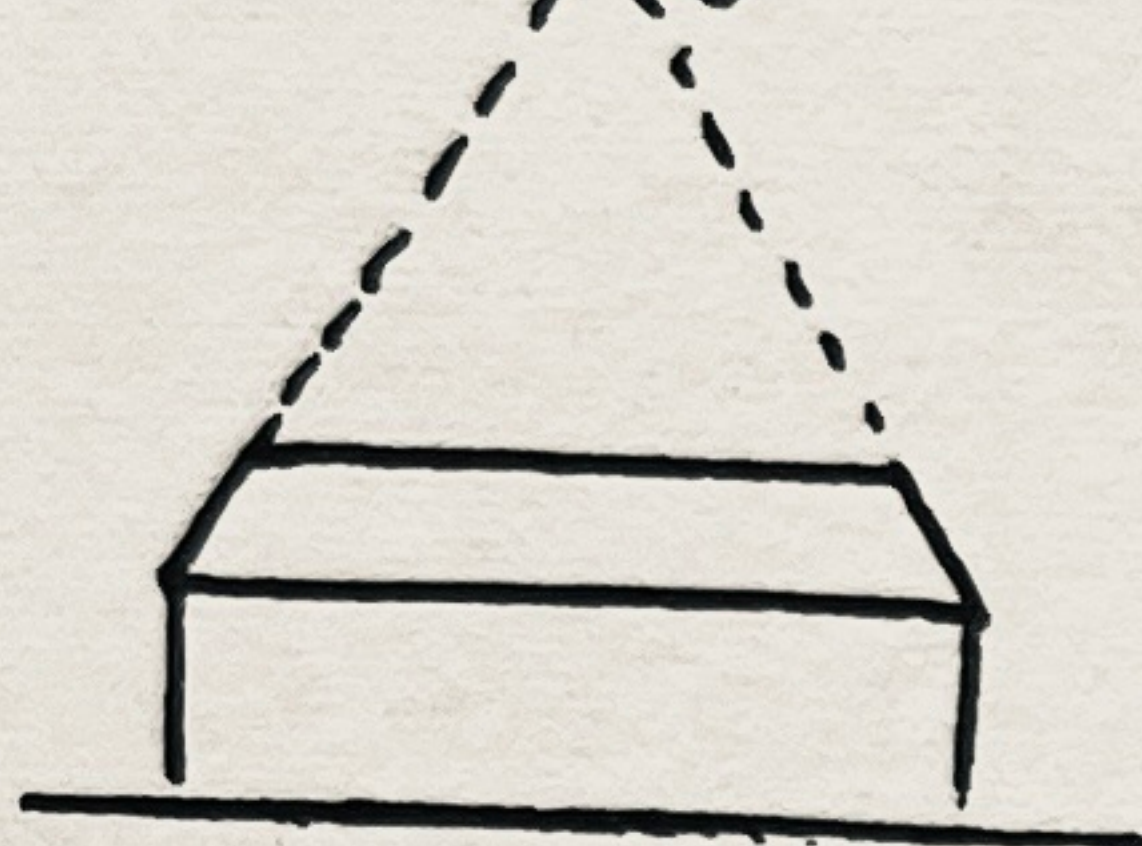
When distance must be represented in such drawings, it is often done isometrically. Isometric perspective is a method of mechanical drawing "in which dimensions in three directions are shown in their true size to the scale of the drawing" (Encyc. Brit.).

Linear perspective is a system by which it is possible to construct, from the actual dimensions of an object, its optically apparent size and shape at any point in space. By using the method of angular measurement described above you will get approximately the same effects.

But neither strict isometric drawing nor strict linear perspective will satisfy the artist, whose aim is the expression of ideas rather than depiction of the optical appearances of objects. If he draws that back line of the box top much shorter than the front, even if he is obeying the mechanical principles of linear perspective, the drawing will not convey to the mind of the observer the idea of a rectangular box. In the artist's terms, a drawing which falsifies in this way is said to be distorted. He must draw the forms of things according to the



Center of Vision



way people think about them, rather than copy their appearances at any given moment. The front and back lines of the box top must be drawn so that they convey to the mind the idea that this is a rectangular solid form.

As we move nearer to the box we see that the back line apparently becomes even shorter in relation to the front line. The perspective distortion increases. If we move further away, the two lines seem to approach each other in length. The perspective distortion decreases. We should draw a form at the distance from which perspective distortion is minimized to the point where our judgment of the real shape of the form is not disturbed. With very large objects such as appear in drawings of a landscape or city-scape, this means that we must draw from a considerable distance. With smaller forms, such as our box, something more than three times its greatest dimension is sufficient.

So if the angles you have measured do not seem right in the final drawing, feel free to change them until they do look right to you. We are making a freehand, not a mechanical drawing.

Now you need no longer be afraid of the angles formed when planes of your box are turned away from you. If they puzzle you, you can always fall back on angular measurement with the two rulers; but do not use that method unless you cannot get any reasonable construction of lines without it. Sooner or later you will not need it at all.

In this assignment we have drawn boxes from imagination, in various parallel and rotated positions in lower left hand space. Our first study of a real box shows it in central space below eye level. In the next assignment we shall study it in left hand space, in parallel, rotated, and tipped positions.

Part I · Assignment 3

Introduction

We discussed in the previous assignment the inaccuracy of various mechanical methods of drawing for the expression of visual ideas, and the necessity of sacrificing some truths in order to emphasize others which we desire to express. If we are making a drawing which is to be mechanically accurate instead of psychologically accurate--that is, accurate to the mind's eye,--we may check up the angles with various instruments. Very often, however, a carefully measured drawing does not "look right"; it does not convey to the mind the proper idea of the object represented.

Here is one of many possible examples, which is known as the Poggendorf illusion. Look at the first drawing. Is the diagonal line a continuous straight line? Place a ruler on it and you will see that it is, although it looks more like two parts of separate lines. A mechanical draftsman would not worry about how it looks, just so it measures right; but the freehand draftsman would have to change that diagonal to make it look like a straight line, if that were the idea he wanted to present. Freehand drawings must not be criticized by means of rulers, for they do not pretend to that particular kind of accuracy. Truth to the mind's eye is the aim of art.

Exercise (a). Tipping and turning forms (cont.).

In the previous assignment you constructed drawings of an imaginary box lying with its corner toward you, in a rotated (or turned) position [Exercise (d)]. Let us now apply the same principles to the drawing of our real box.

Take up your position as described in Exercise (e), Assignment 2, but this time rotate the box so that its corner is pointing toward you. The horizontal lines which were parallel to your face in the drawing of the box in central position are now seen as diagonals. The vertical lines seem to remain about the same.

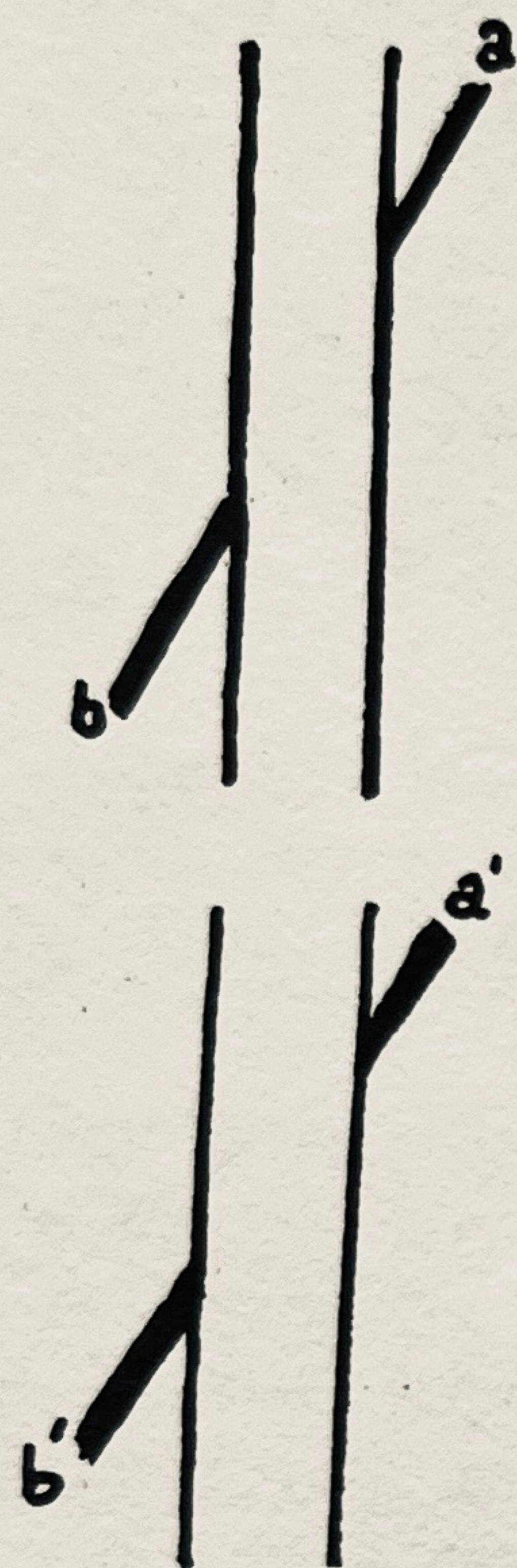
Set down this new view of the box as accurately as you can, freehand, paying special attention to the angles of the diagonals with the verticals. Compare the resulting drawing with those you did for Exercise (d), Assignment 2.

After finishing this drawing, return the box to its first position, then slide it to the left on a line parallel with the end of the table. Slide it until you can see not only the top and front from where you are sitting, but also the end. The front is still parallel to your face, but the box now lies in left hand space, relative to you. Three planes of the box are now visible: the top, the front, and one end.

Make a drawing of the box in this position. Notice that there are more diagonals in this drawing than in the first (the central position), but not so many as in the drawing of the rotated box.

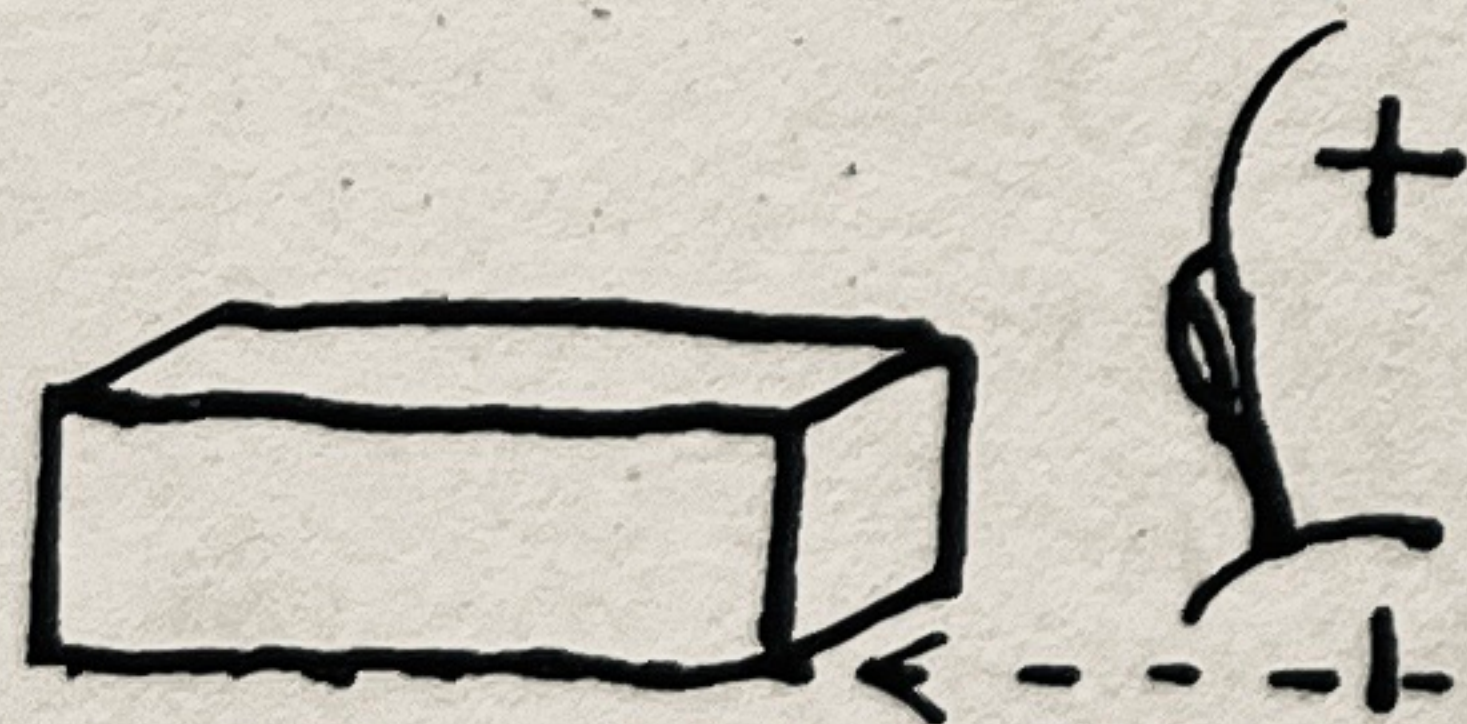
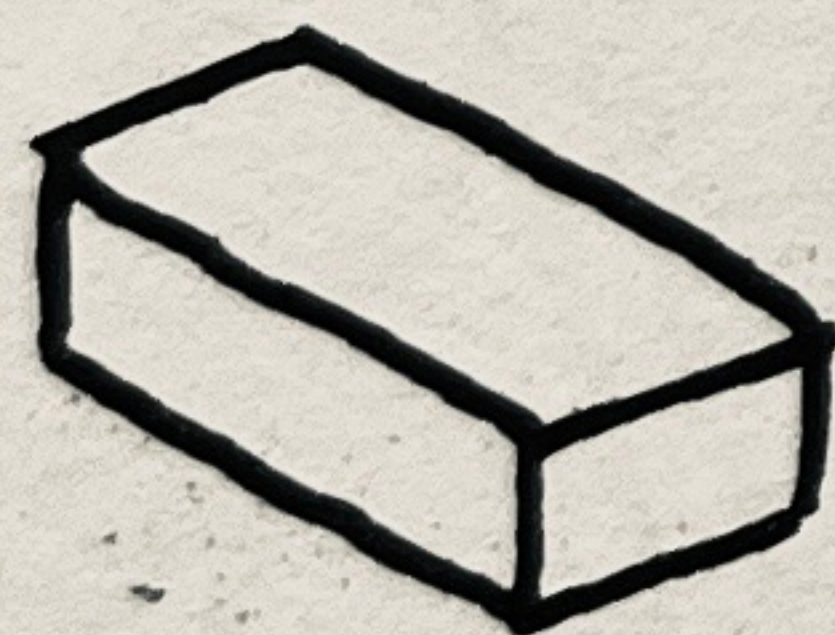
Compare these three drawings and consider which one seems to show most depth, or space effect, away from you. Is it the one with more and longer diagonals?

Be careful not to confuse in your mind the box in rotated position, and the box which has moved into left hand space. Remember that you must not change your own position in space, and you should



a-b = mechanically correct straight line

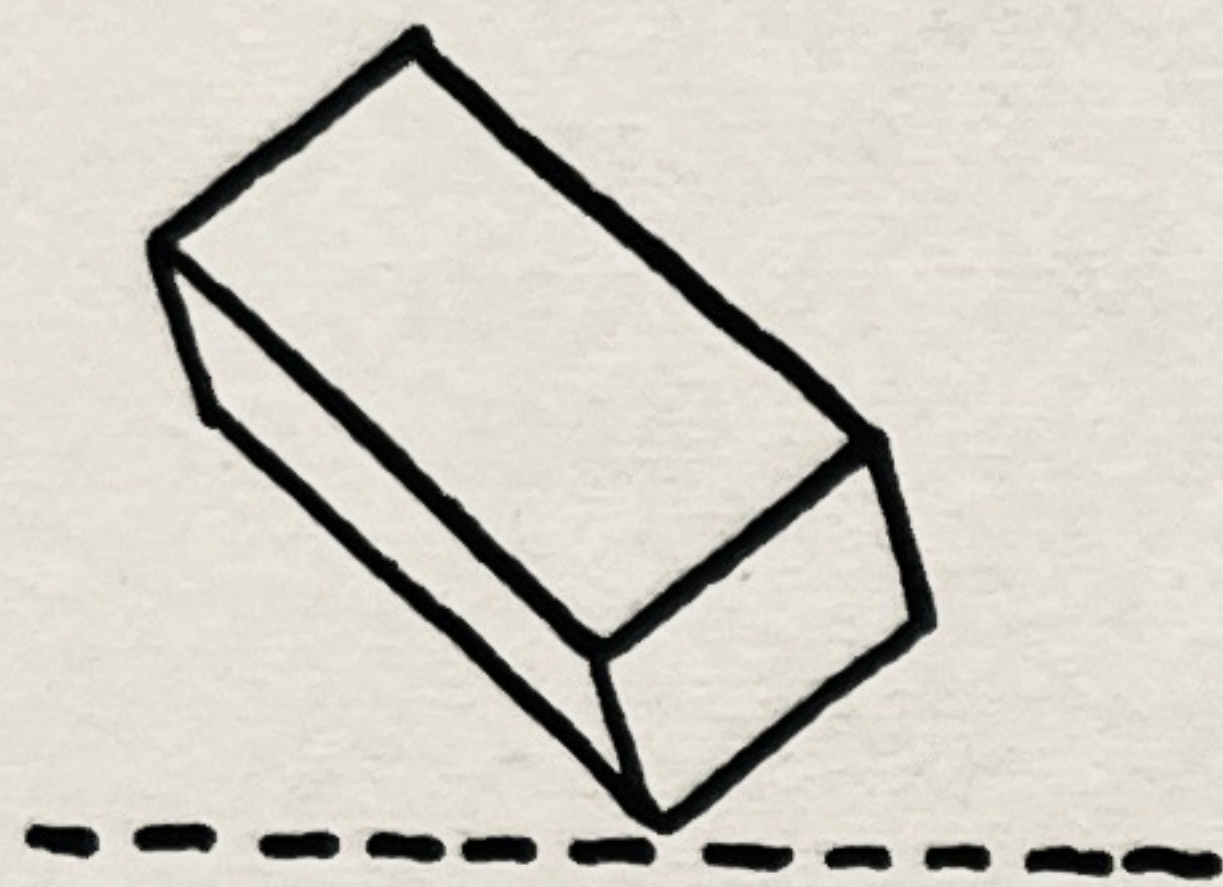
a'-b' = visually correct straight line.



turn your head as little as possible to see the box in the new position. In this way your feeling of the original parallel relation between yourself and the box front will not be lost, and you will see when the box either deviates from this parallel or agrees with it. This is very important for judging the angles of the diagonals in your drawing.



Now leave the box in its last position, but place some small object under its rear edge, so as to tip it forward. You will notice two changes when the box is tipped: more of the top may now be seen; and the lines which before were vertical have become diagonals. The horizontals are still horizontal, as in the last drawing, are parallel with your face, and should be drawn parallel with the top and bottom lines of your paper. This is the only way of conveying the idea that the box is parallel with you. But the front face is now tipped forward even though its horizontals are still parallel.



Judge the angles of the verticals which have become diagonal. Try to draw the box in its new position so as to convey to the mind's eye the idea of a box which has been tipped toward you, is a little on your left but parallel with your face.



Draw four such boxes for this exercise, after practicing until you can do them fluently. On your sheet will appear (1) one box in a rotated position, directly in front of you; (2) one box in parallel position but moved to the left so as to show one of its ends as well as its top and front; (3) one box tipped forward from position (2); and (4) one box both tipped and rotated, or tipped forward from position (1).

Observe that when we change the horizontals to diagonals we give the effect of turning or rotating. When we change the verticals to diagonals we give the effect of tipping.

Try drawing a heap of several books as an exercise in combinations of tipping and turning. It will help you to keep one book parallel with yourself, for purposes of comparison.



You will find many objects which vary slightly from the box shape, which you may now attempt to draw.

Include your most successful sketch of tipped and turned books or similar objects, as the final drawing of this Exercise.

Measure, Scale, Proportion

How may we convey an accurate idea of the size of an object which we draw? How does a drawing say "life size," when the lines are not nearly so long as those of the real object?

The correspondence between elements of the object drawn and the lines of the paper is important. Some things in a drawing, such as the horizontality and verticality of lines, may agree exactly with the subject. Other things may only seem to correspond because within the borders of the sheet of paper they stand in the same relation to each other as do elements of the object drawn. For instance, your first drawing for Exercise (e), Assignment 2, presented an idea of the relation between the width and height of the box.

Now you must think about the relation between the amount of space which must be represented around the box, and the size of the box itself. It is by establishing this relation properly that we achieve the effect of "life size."

How large should your box appear on the paper? This is the way to find out:

Looking at the center of the box, extend your arms full length, palms of hands parallel; so that you are just able to see the middle point of the box between your index fingertips. Now spread the arms



horizontally until the hands are about a foot apart. Keep your eyes on the box, but think of your fingertips. Can you see the fingertips clearly? If you can, spread them a little further. You will find that when they are about a foot apart they will begin to leave the area of clear vision.

Now begin again from the middle point, this time moving the hands vertically from the center, above and below. Again stop when the fingertips are no longer sharply seen.

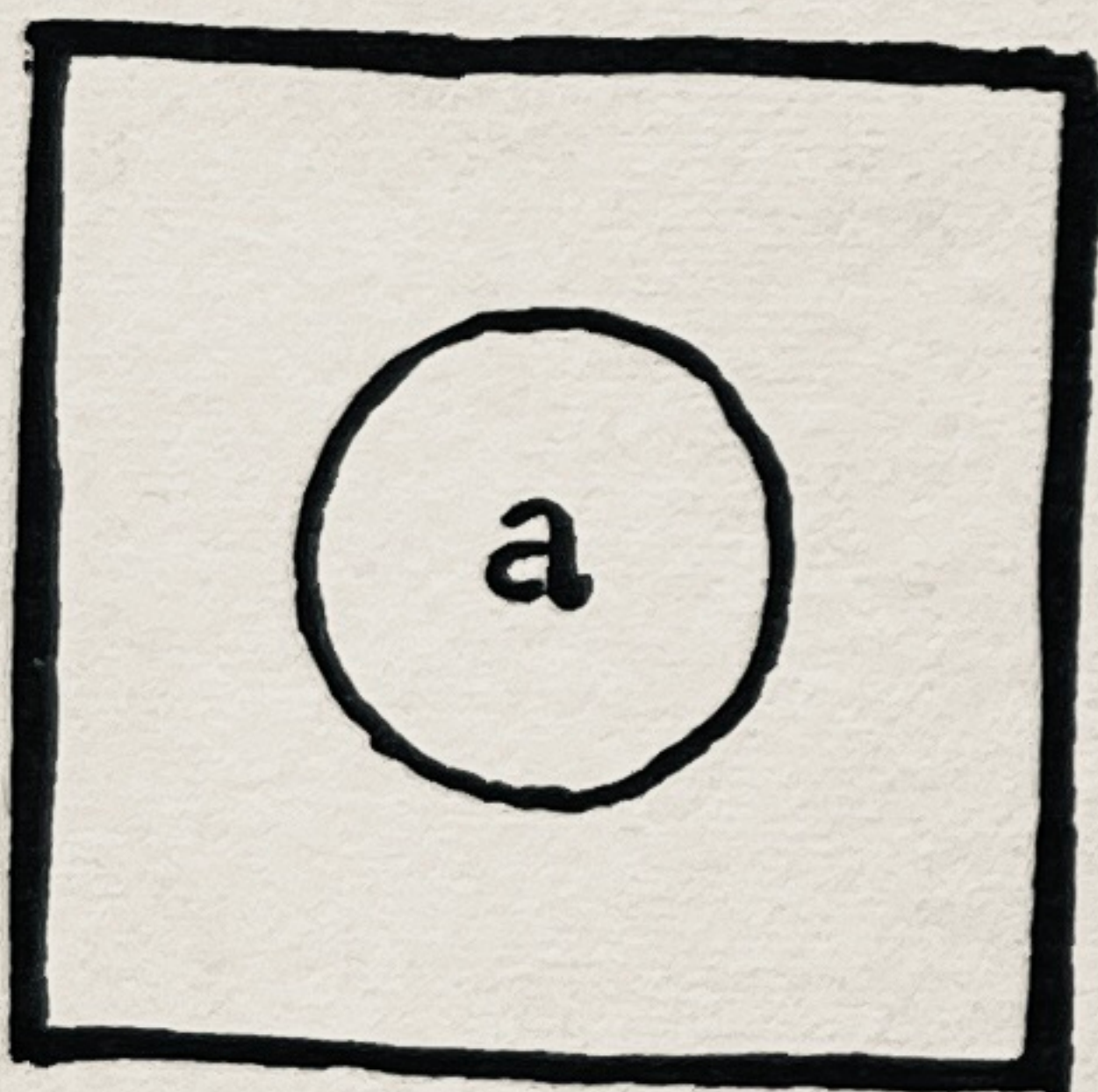
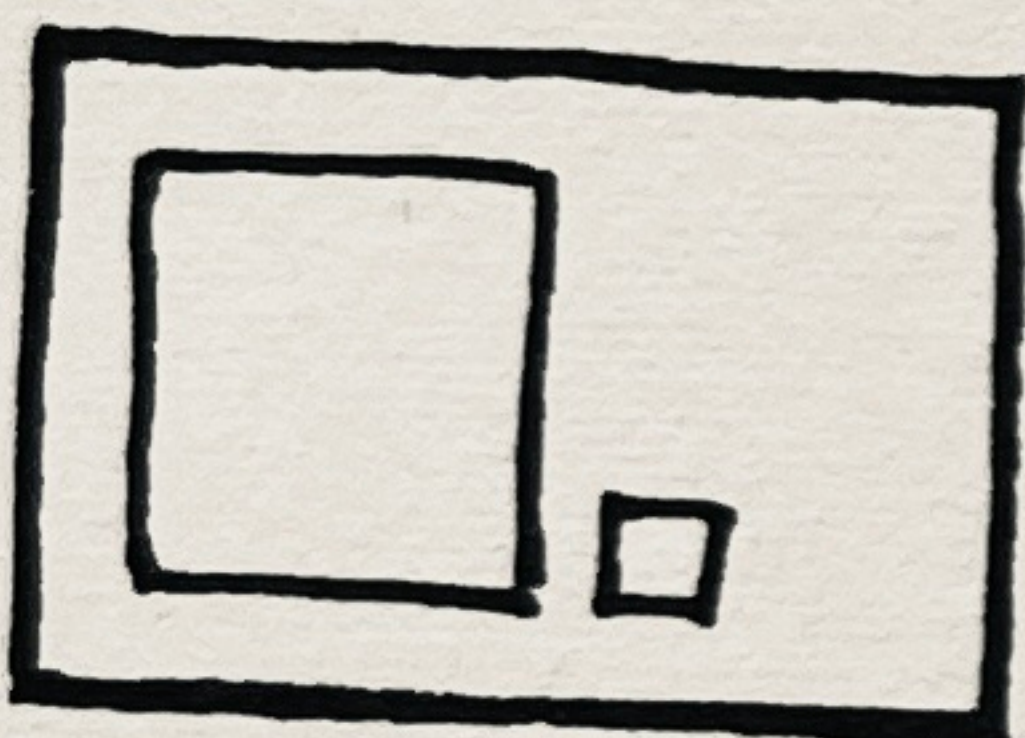
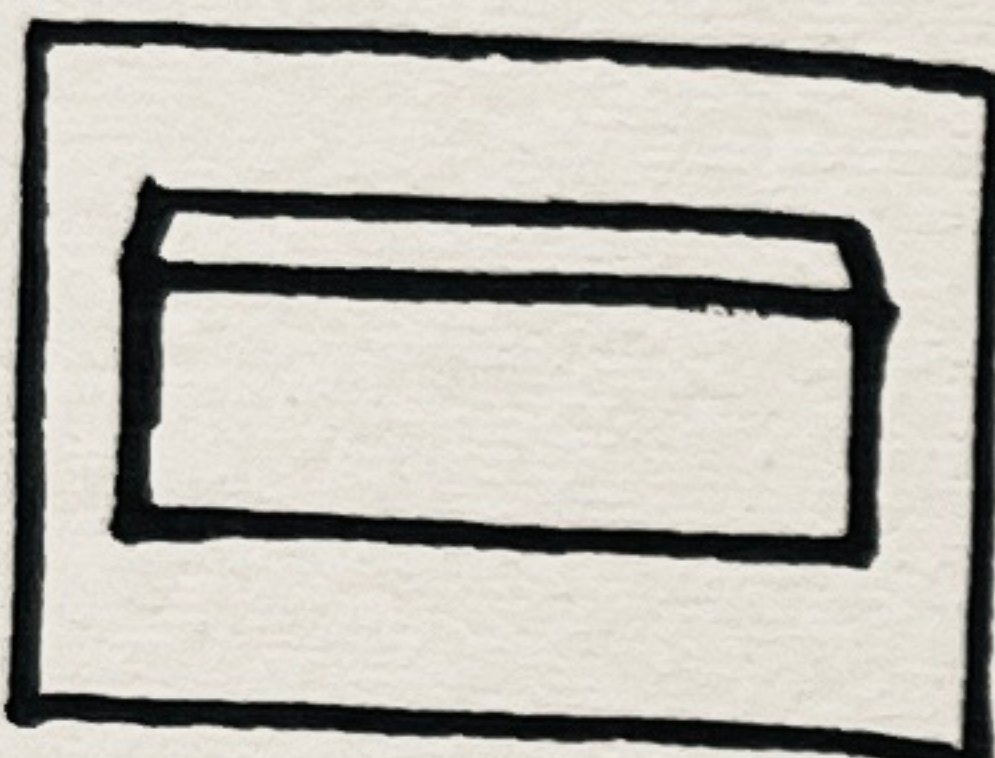
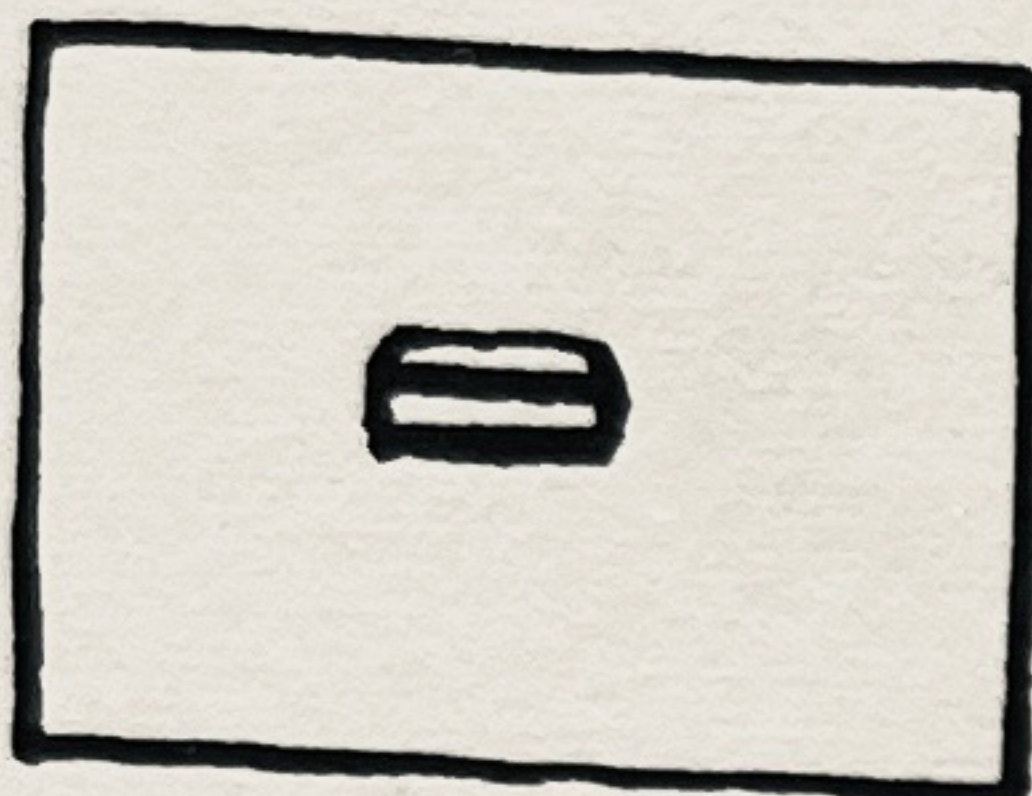
The middle point of the box will correspond to the middle point of your paper. By spreading your hands as described, you have located the edges of the field of clear vision which exists when you look at the center of the box. This is as much of the space around the object as you should draw. The amount of space left between your hands and the box is relatively the amount which should appear between the drawn box and the borders of the paper.

If you include more space than this around the box, your drawing will suggest a smaller box than this one really is. If you include less space, the drawing will seem to represent a larger box. The size effect of an object in a drawing is determined in the first place by the relation between its drawn size and the size of the sheet of paper, or the border around it.

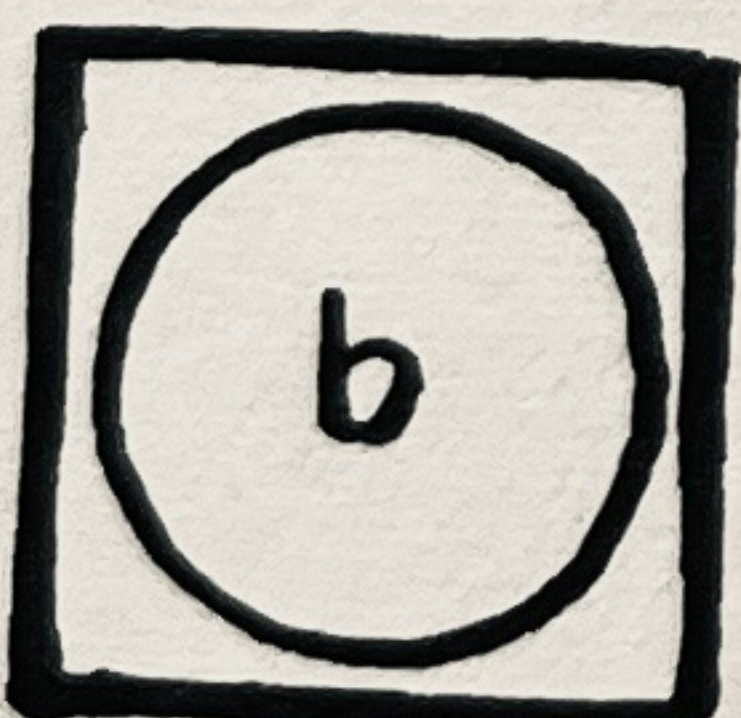
Why is this true? Because, when we look at objects around us in space, we unconsciously associate with their visual images the due amount of space with which each is surrounded. We see more of such space when we are far from them or when they are very small; less when we are near or they are very large. As a result, we associate (and sometimes confuse) in our minds the ideas of bigness with nearness, and smallness with farness.

We must not forget other factors which may influence size effect. When more than one object appears within the picture, the size effect of each is affected by their internal size relation. Thus a big object beside a small one will emphasize the bigness of the one and the smallness of the other. This effect is much stronger within the borders of a drawing than when it is seen in nature. Forms are never seen unrelated in nature--there are always other shapes in the field of vision--and when a form is removed in part or altogether from this context and placed within the borders of a picture, a new relation, that of the drawn shape or shapes and the surrounding and adjacent shape of the format enters into the total effect. Even though we draw a whole section from the panorama of nature the effect of the format will still be active. It will cut across shapes at the edges and will change the meaning of the context of shapes within. The picture frame, or even the edges of the sheet of paper will emphasize the new relations, so that the artist is forced to change the size relations of objects drawn from nature in order to avoid exaggerated effects of differences in size within the drawing. This is particularly true of the size relations of objects seen in deep space, when using foreshortening or perspective methods. Often objects near at hand must be reduced in size from their appearance in nature, and objects in the distance increased in size in order that the effect of placing them within the frame may not produce exaggeration of size difference. Also, rhythmic considerations--the need for clear, orderly, proportional relationships in any work of art which will communicate its meaning successfully--affects the length of every line and the area and shape of every plane which appears in the drawing. The activity of making such adjustments is known as composition.

But before we attack these problems in detail, let us draw our particular box with its due amount of space around it, right for the distance from which we are regarding it, and right for the psychological effect. Again, no exact system of measurements can determine just what will "look right," although there are mechanical crutches to aid us in our general judgments.



*a and b are
measured equal-
but size-effect
is different*



due to framing

Exercise (b).

In order to avoid introducing too many new ideas at once, let us go back to Exercise (e), Assignment 2, and repeat it. This time we shall use a whole sheet of paper, and pay careful regard to the relative size of the box and the amount of space we leave around it.

Draw in the bottom line of the box, parallel with the lower edge of the paper as before. Try to make its length seem right in relation to the paper size, which stands for your field of clear vision.

Finish the drawing thinking not of the box alone but of the relation of its proportions to the space around it. You may find it necessary to make several attempts before you please yourself.

Include this full sheet in your assignment.

We are now ready to systematize the knowledge of space drawing which we have gained. The next assignment will deal with space above and below the eye, and to right and left of the observer.

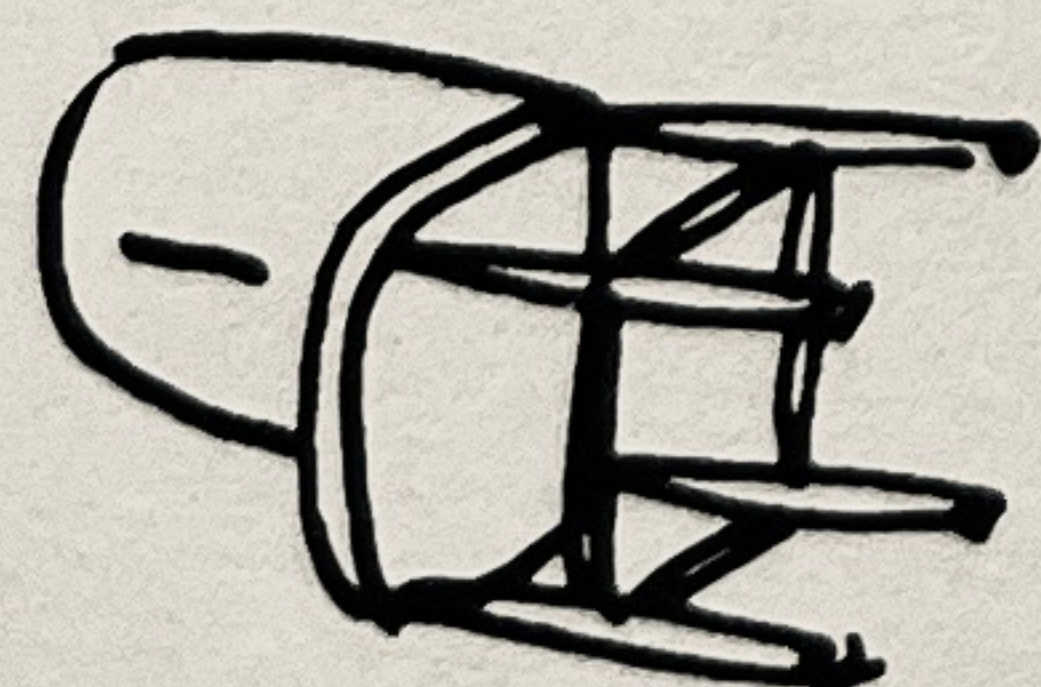
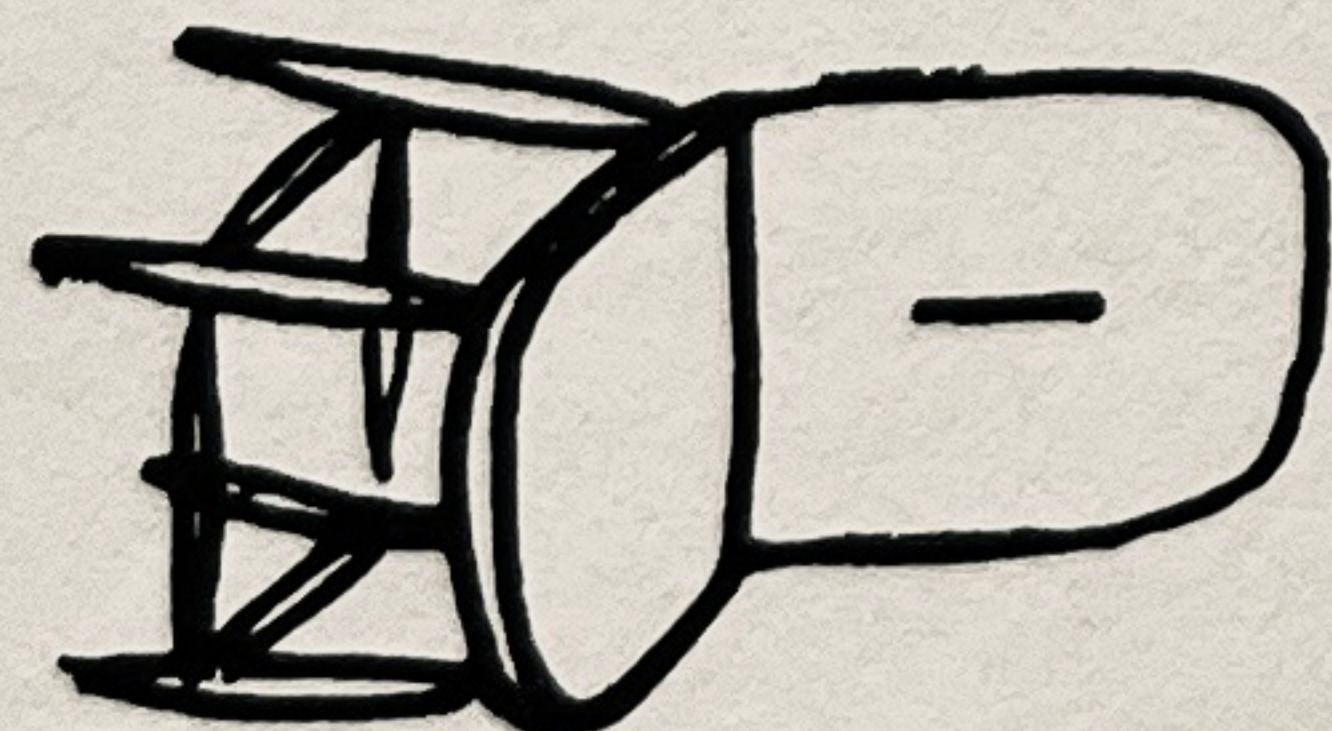
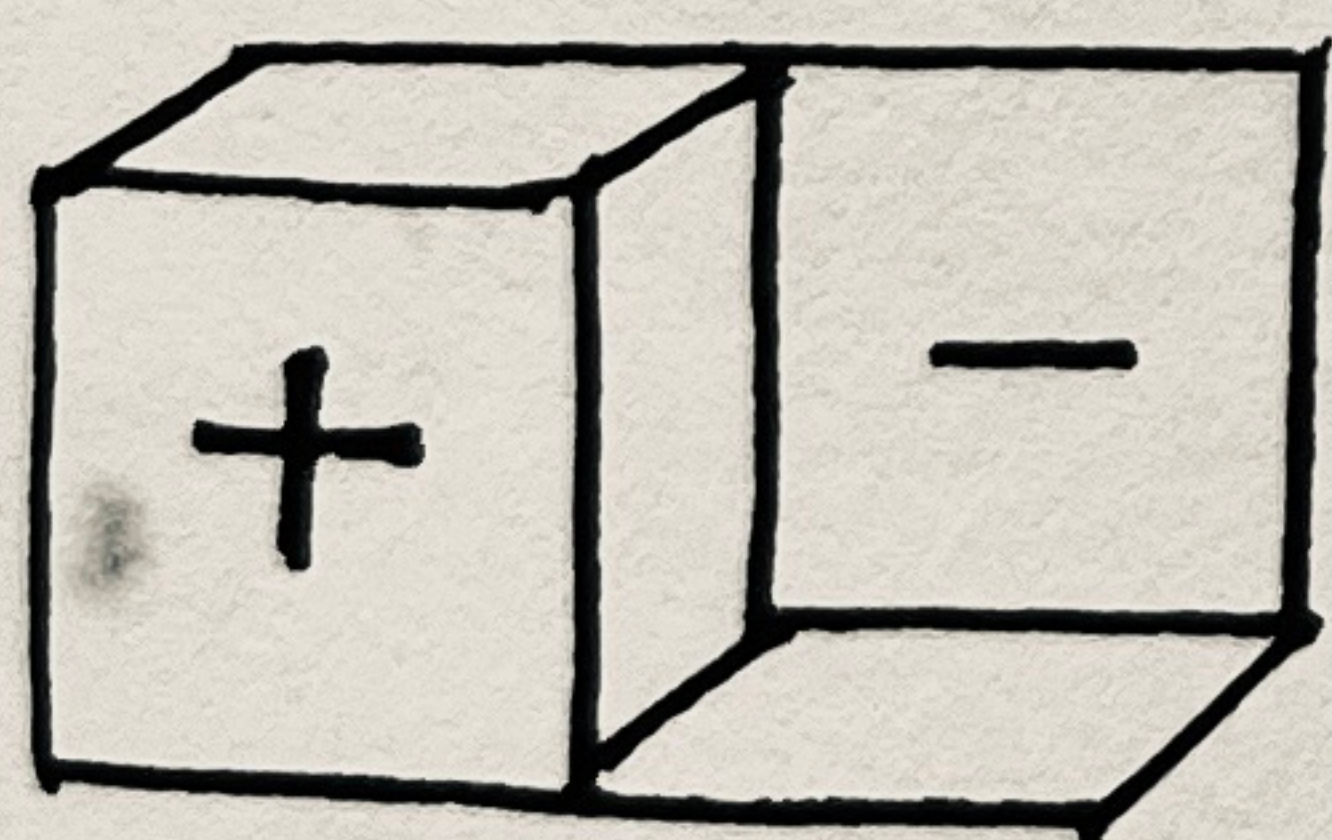
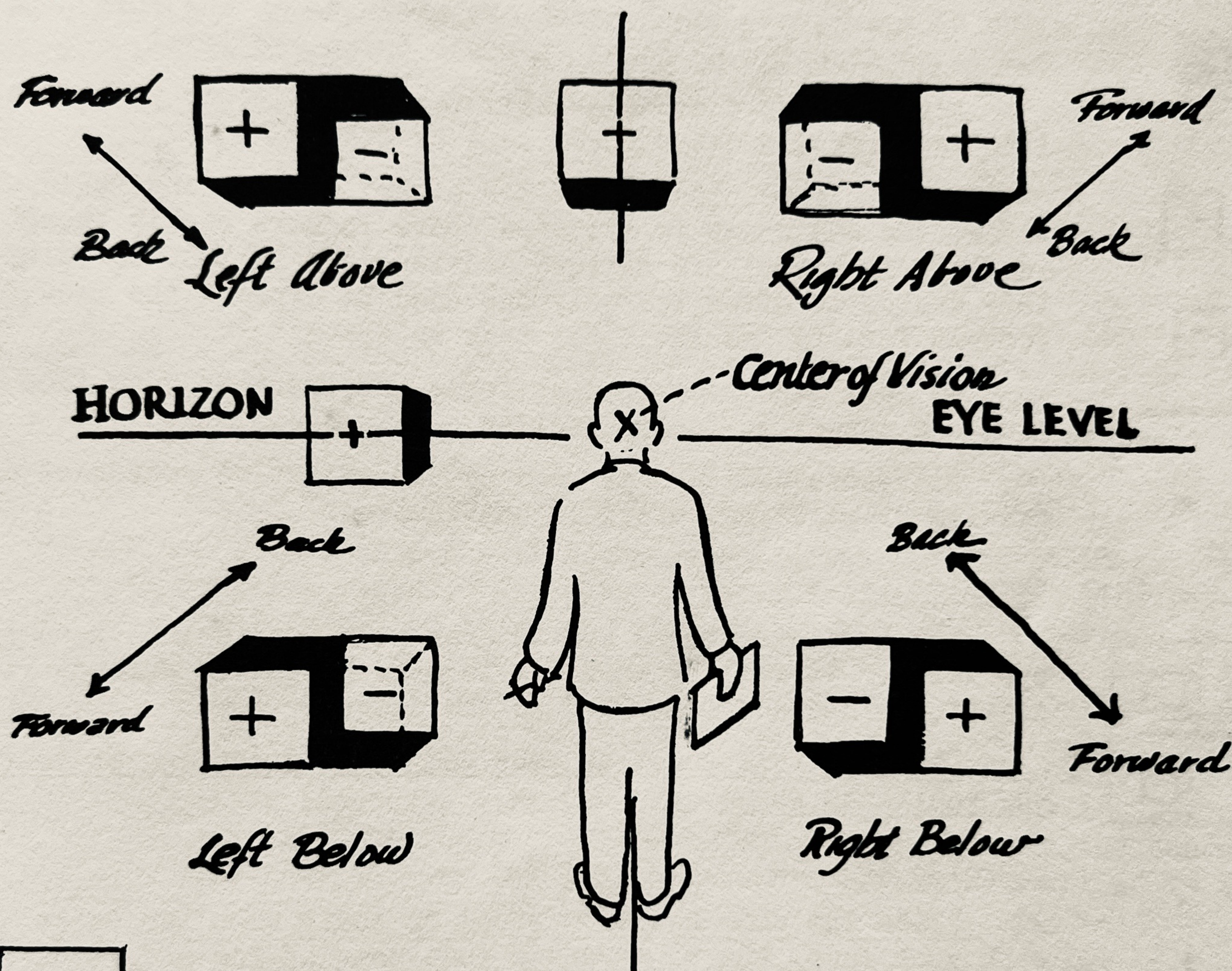
Part I • Assignment 4

Space Drawing (cont.): space above and below eye level; and space to right and left of the observer.

We have learned to draw simple block forms from several points of view. It remains to practice drawing them in all possible positions. For the sake of simplicity, in our first space drawings the box was placed in space below eye level, where we studied it in central position and then shifted to left.

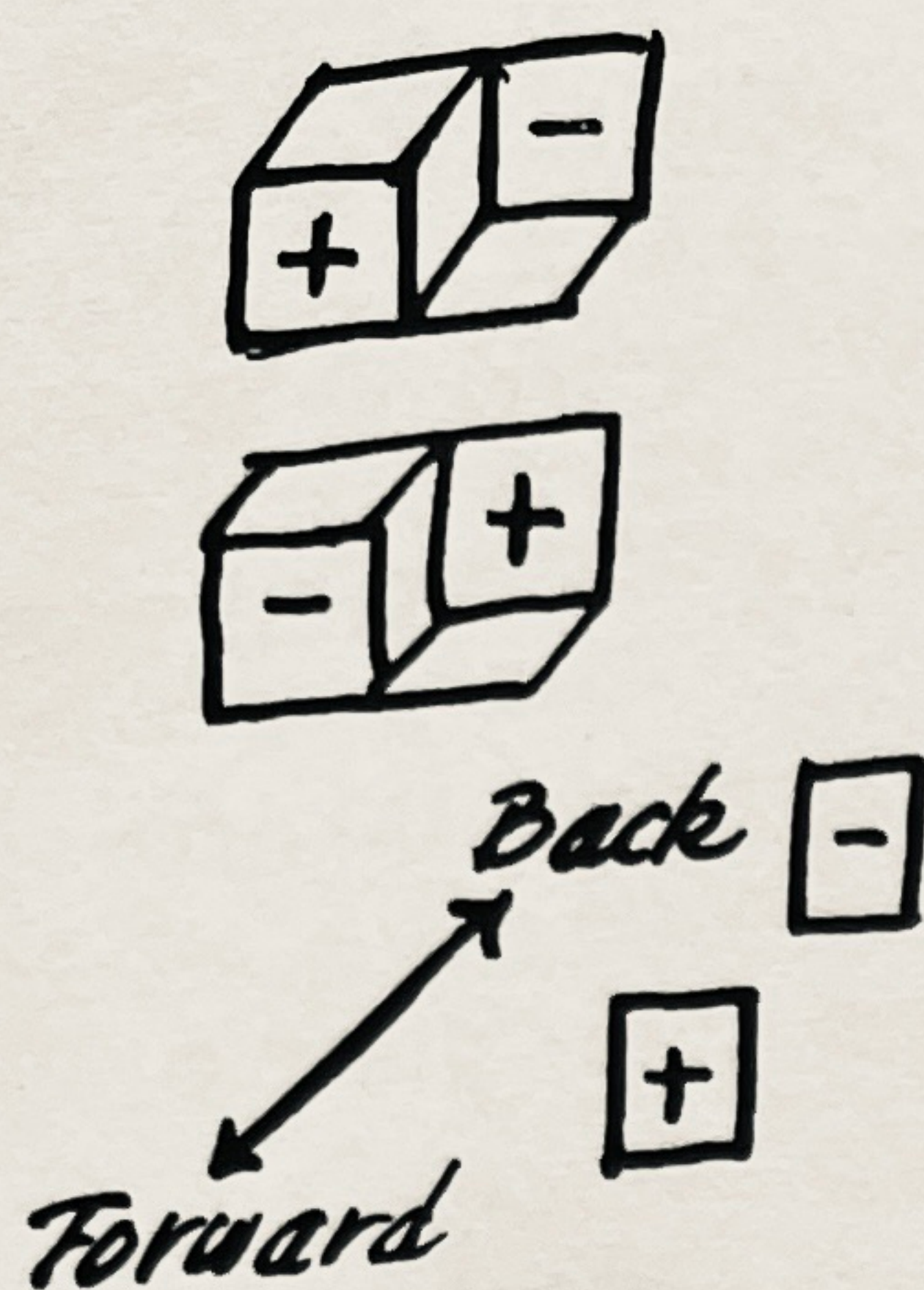
Now let us consider other positions. Be sure that you still hold in your mind the idea of one particular box, with a particular size and shape.

Let us arrange several drawings of your box in a systematic chart, like this, placing alongside each box a transparent one with only its back plane opaque:



The front of each box is identified by a plus sign. The back of each transparent box has a minus sign. The horizontal line in the diagram stands for the eye level of the observer; the vertical down the center for a line which passes perpendicularly just between his eyes. All the boxes in this diagram are drawn parallel with the observer's face and hence with the horizon, or eye level. The point toward which the observer is looking is the center of vision, and it is on the horizon, where the vertical intersects it.

This is the first time that we have dealt with forms which may be "seen through." If you have any trouble in visualizing the boxes, try thinking of the bottom, back and four legs of a chair. Of course the shape will not be exactly rectangular, but it will serve very well as a subject for practice in drawing this sort of form.



If you have any doubt as to the importance of knowing where you are in relation to your subject matter before you start to draw, compare the diagram of opaque and transparent boxes in upper right hand space with those in lower left hand space. Notice that as to drawing they are identical; they may be identified and interpreted only with reference to the observer's position. When we think of the figure as below us, the left hand cube seems to be the opaque one and the right hand one transparent. If we move the figure above the eye the meanings are precisely reversed; the right hand cube seems to express solid volume.

Since we spend most of our time looking at objects which are below eye level, our visual habits are formed on this basis. Unless some special circumstance causes us to think of a figure as above us, we will think of it as below and read its lines accordingly. Hence, unless the line of eye level, the horizon, is shown under our form, the figure is apt to be accepted as being in space below eye level.

For the same reason, we will accept the lower part of a diagonal line as forward and the upper part as back.

Again, if we place two forms of any sort on the surface of the paper, the one which is situated above is more easily thought of as being back in space. In antique drawings and in many children's drawings this device is often the only one used to express the idea that one object is forward and the other back in space.

We have also seen that as forms move further away from us their dimensions appear to become smaller.

All these devices are used by the artist to represent distance in a drawing or painting, often in combination.

Exercise (a).

You have discovered how to draw your box in left hand space below eye level. It will be easy now to make a drawing showing it in all the positions in space indicated in the diagram.

Devote a full sheet of your pad to this drawing of your box in all the positions shown.

Exercise (b).

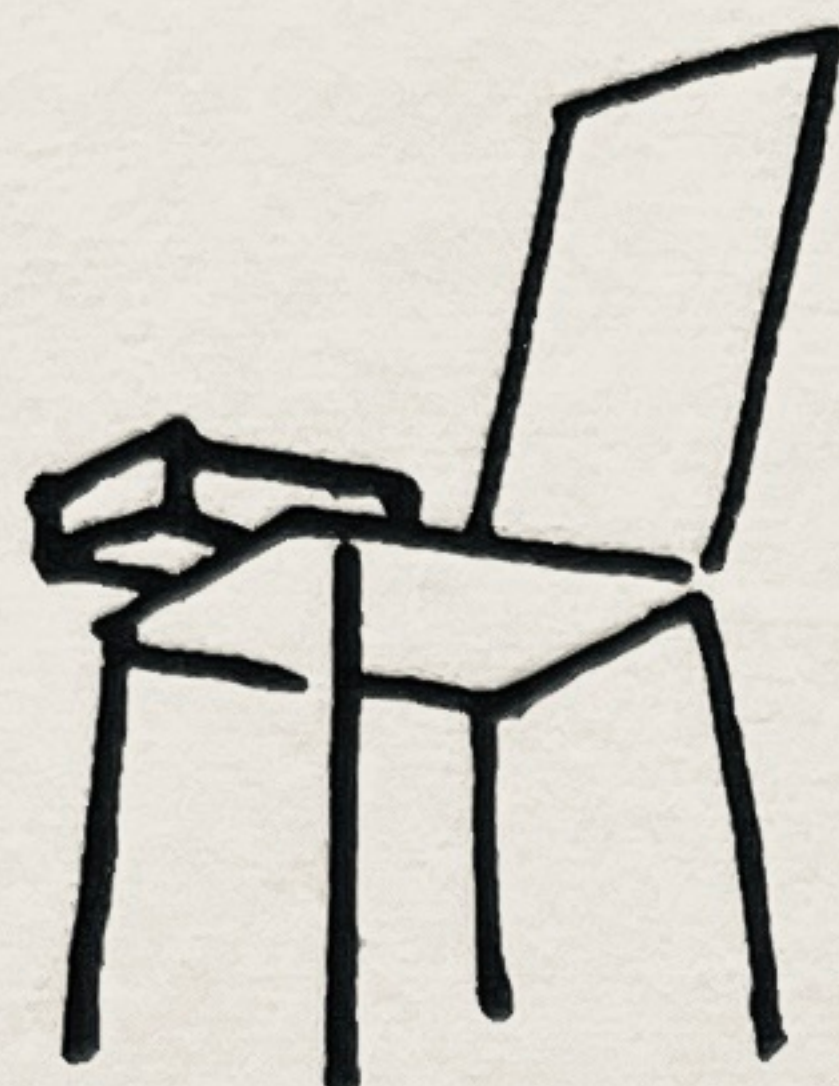
Place the shoe box on a stool or chair upon the table, parallel with your face, but so arranged that some of the underside of the box now appears. Of course that part of the bottom of the box which is resting upon the supporting chair will not be seen, but some of the underside should extend beyond the chair seat.

Arrange the chair so that it also is parallel with you. In drawing the chair with the box upon it, you will find that the chair may be drawn, or "blocked in," very like a box. Some chairs are simpler and more blocklike than others, but the four legs will generally be found to outline a box shape, and the back will slant only slightly from the vertical. If you can, begin with a chair which has vertical legs, since the more the chair deviates from the box shape, the more complicated your drawing must be, and hence the more difficult at first.

Draw the box and chair in the following positions in space:

- (1) Directly in front of you, parallel with your face, with chair bottom and box above eye level.
- (2) Moved to left on a line parallel with you, leaving the box in the same position on the chair.





- (3) Moved to right on a line parallel with you.
- (4) Directly in front of you, but rotated so that the corner of the chair is turned toward you.
- (5) Moved well over to left from position (4) along a line parallel with your face (keep the chair in its rotated position).
- (6) Moved as above well over to right.

Note that the diagonal lines which recede into space in this series of drawings show a different behavior when they are above eye level from that shown when they are below.

By this time you should begin to understand the ways which we have considered for representing the four kinds of space which exist relative to the observer:

Space below his eyes to right of him, or right hand space below eye level.

Left hand space below eye level.

Right hand space above eye level.

Left hand space above eye level.



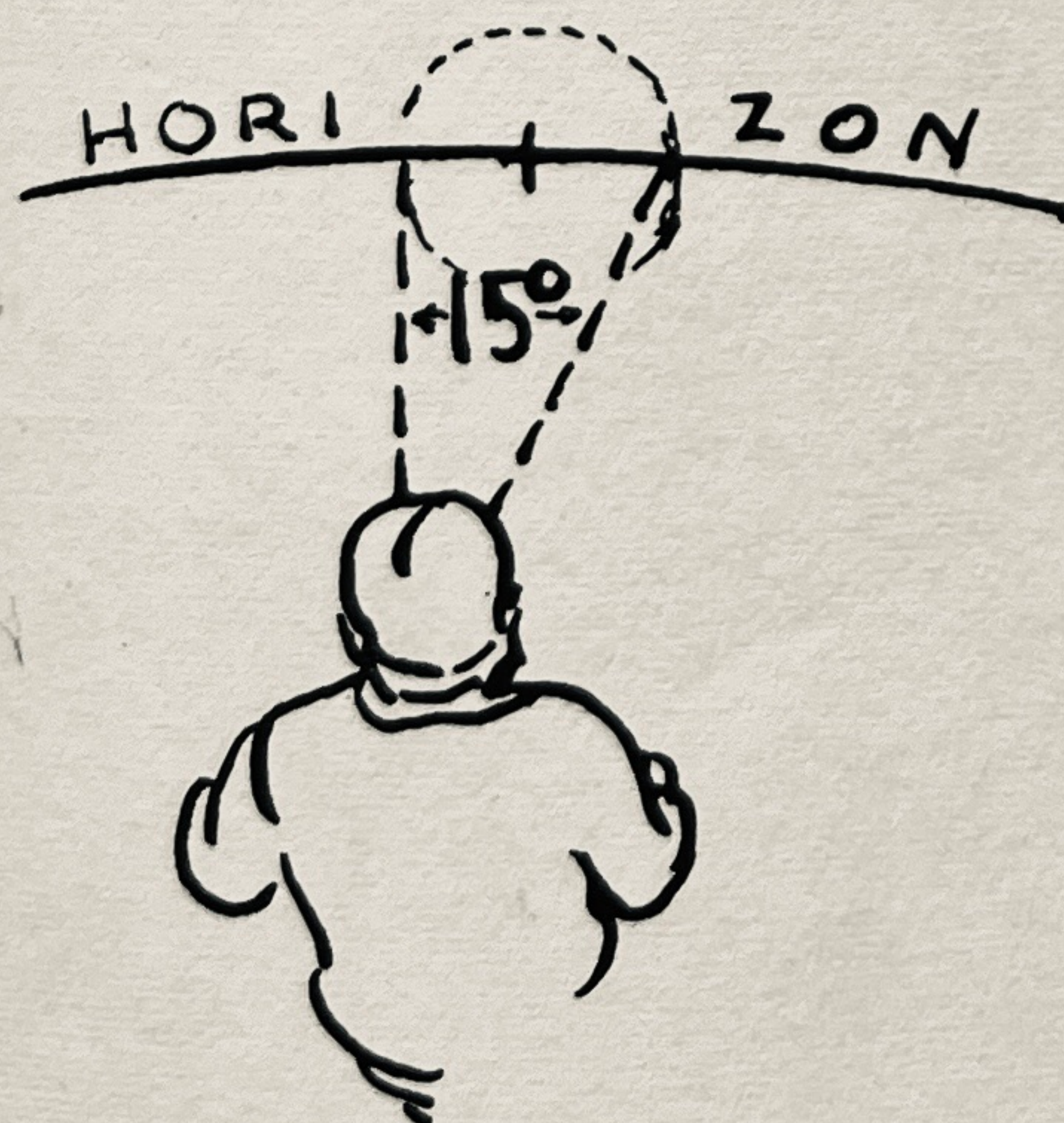
Notice the importance of eye level in these judgments. When a man stands in a normal vertical position, looking out over level land or water to the place where it meets the sky, he sees the horizon and his eyes are level. Of course, he is really looking at the curve of the earth, at the point where the curve is tangent to his line of sight, where it begins to turn away from him. The higher he is above sea level the further away this point is. But his height is so small compared to the length of the line from his eyes to the horizon that he is not conscious of any angle between that line and the earth's surface.

In such a position the eyes and the line of sight are, practically speaking, level. The horizon appears as a straight line parallel with the face of the observer, even though the earth's surface is really curved and the line between sky and earth or sea is part of that curve. Man's area of clear vision is so small that he cannot see enough of this line at one time to sense its curvature. Of course, an observer who ascends to tremendous heights, as in a stratosphere plane or balloon, perceives the curve directly. He not only knows about it, but actually sees it. But the horizon seen from sea level, with the hands outstretched to mark the area of clear vision (as described in Assignment 3), is perceived as a straight line.



We may therefore draw the horizon at right angles to the vertical of our paper. And we may consider it, under usual circumstances, as a straight line parallel with the face of the observer.

Exercise (c).



- (1) In a square about four inches wide, draw a house which you have imagined. It need not be a complicated house. Place it below eye level. Indicate the horizon by a level line across your square. If this line is near the middle of the square, you are informing an observer that he is looking at the house from slightly above. Draw the diagonals of the house to agree with this idea.
- (2) In a similar square draw another house, this time arranging things so that the observer looks down from an immense height. The horizon will be very high in this "bird's-eye view."
- (3) Now give us a "worm's-eye view" of your house. In this case the bottom lines of the house will coincide, or almost coincide, with the horizon, and the greater part of the house will appear in space above eye level.

You may exercise your knowledge of scale also in these drawings, by putting doors and windows in the house. If the door is large, it will nevertheless be accepted as a door of ordinary size, in an unusually small house. We are apt to think of the usual size of door unless there is strong evidence to the contrary in a picture.

Try several drawings of houses, with doors and windows in various positions.

Invent houses by thinking of your boxes as stacked alongside and on top of each other.

The roofs, of course, will have the angles of tipped cubes or blocks.

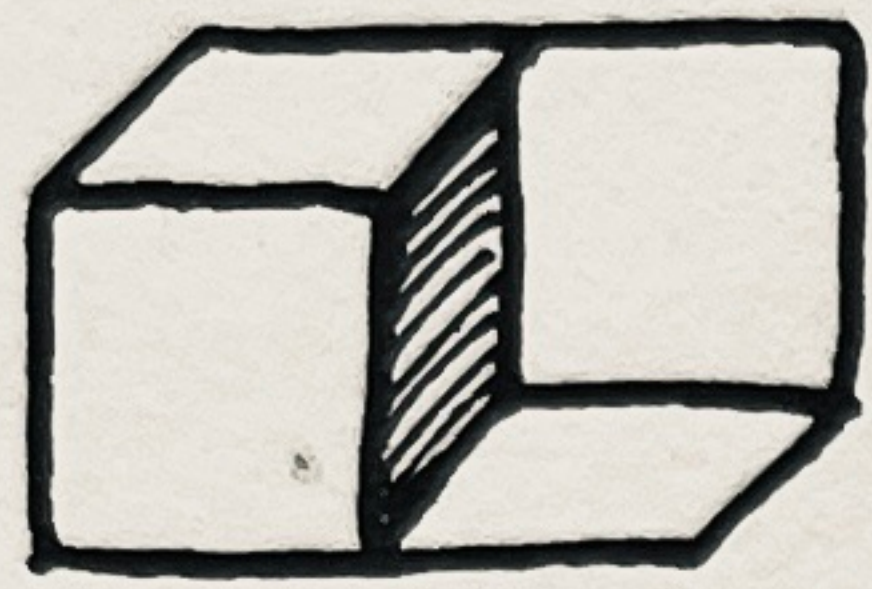
Fill out your sheet with three of your best house constructions, including an L-shaped one and a two-story one. These will be drawings (4), (5), and (6).

Next we shall extend our knowledge of space drawing, and learn how to deal with curved forms.

Part I · Assignment 5

Introduction

When we draw a picture on the flat surface of the piece of paper, it is necessary to arrange our lines and spots in a two-dimensional pattern; a piece of paper having actual height and width, but no actual depth. Any real depth, thickness, or third dimensionality which exists in our subject must be expressed--if we choose to express it--by means of symbols which stand for the depth dimension. This metaphorical space effect is achieved by placing symbolic lines and shapes and indications of direction on the flat surface of the paper, in such relations that they call up in the mind of the observer memories of real eye-experiences with space. Up and down expansions of volumes or spaces and up and down lines will of course be brought about by extending the line, the volume, or the block of space on a line parallel to the actual vertical axis of the format. Horizontal expansions, directions and movements will progress parallel with the horizontal of the format. Such directions in effect repeat the vertical and horizontal axes of the format, which are its two dimensions, and tend to emphasize the effect of flatness in the drawing.



The directions on the format which will be useful in indicating movement away from the flat pattern--although of course they actually lie on the surface of the paper too--will be the diagonals. Drawn lines or lines suggested or implied by the relations of drawn shapes which are diagonal are most concerned with space effect. Composing a picture in space will often require a certain emphasizing of such diagonal relationships, since due to the accidental effects of light they are not always apparent as required in nature.

We are equipped with sense organs which inform the mind about the world outside us. Man's "five wits" (sight, smell, taste, hearing, and touch) begin in specialized nerve endings, located in his body in those places where they will be of most use to him. Each of these senses possesses reception apparatus which brings in information about what is going on in the world outside the body.

No single sense organ working by itself is capable of bringing in complete information. In the mind, however, we subconsciously store up sense experience. We may draw upon this library of the mind to amplify the information furnished by one sense operating alone; in fact by virtue of this stored experience the mind often may go about its business on the basis of quite meager sense information.

We are apt to see what past experience leads us to expect to see; unless we bring all our senses into play upon a given subject, we are sometimes led into misjudgments. These are called illusions. Any sense working alone, such as vision, may be responsible for them; the evidence of the other senses is often necessary to correct them.

Thus, the burnt child need not go on touching fire all his life in order to find out that it is hot. He learns to recognize fire for what it is by means of his eyes. The memory of heat is strong enough to come into his consciousness whenever he recognizes the visible aspects of the whole reality which is fire. In eye-language, fire means certain shapes and movement of shapes, certain colors. The colors called "warm" are those which from time immemorial have been seen in fires; red, orange, yellow stand for warmth even when they are completely dissociated from the shape and movement of fire.

Speech is understood because its sounds are symbols for ideas which already exist in our minds. Eye-language is effective for the same reason. The visible aspects of objects seen in the world around us may call up memories of experiences associated with such objects, of touching them, smelling them, tasting them. The richer one's store of past experiences the more meaning new ones may acquire.

Let us emphasize again, however, that judgments made in this way are not infallible. The spots of light which fall on the retina of the eye may convey a false idea of the form at which we are looking. We look at an object--a rock, perhaps. Our previous experience with rocks has informed us that they are all relatively heavy. This particular assemblage of shapes,

colors, textures, and sizes, may, however, clothe a rock which is hollow, or unusually light. We may be surprised when we pick it up: when we add the evidence of our sense of touch, our kinesthetic sense.

In the field of vision as well we tend to rely upon past experience for help in interpreting the present. In general we are satisfied to recognize things visually without having to touch them, to test their shape, size, weight, and position in space. It is this which makes possible the arts of drawing and painting.

The eyes do not see depth directly; they see only flat pattern, an assemblage of colored shapes. The images received by our eyes are resolved by the mind, aided by kinesthetic memories or associations, into ideas of space and volume.

The young infant begins very early to gain the experience by which he will be able to see and understand forms in space. At first he knows the world only as a kind of cylindrical curtain surrounding him, a curtain upon which appear and disappear various colored shapes. His first perception of solidity comes when he grasps something which has thickness.

The first years of his life are spent in constant experiment and exploration. To become acquainted with an object he first grasps it; this tells him about its size and weight. Then he conveys it, if possible, to his mouth and nose, to discover its taste and smell. Often he comes back again and again to an object until he has comprehended it with all his senses. Finally he reaches the stage where his eyes, aided by his memory, give him sufficient information, so that he is no longer so curious about it. When he sees a ball, he remembers how its roundness feels. There is no longer the same necessity for picking it up; now he recognizes it visually by its characteristic pattern of color, light and dark, and texture. If by chance this pattern is destroyed by some unusual lighting, he will not recognize the ball, and will have no memory of its roundness. He may have to touch it again to find out about it.

The kinesthetic sense which provides us with our actual three-dimensional experiences is the first of the senses to develop among the lower forms of animal life. Throughout the animal kingdom it remains a most important one, to which all final judgments as to the real existence of objects in space are referred. A decisive test of the physical reality of an object is said by some philosophers to be "extension in space." If it fills space, if it has volume, the thing is real.

Again, philosophers have told us that "only comprehended experience is real." The word comprehend derives from the Latin prehendo, meaning seize or grasp.

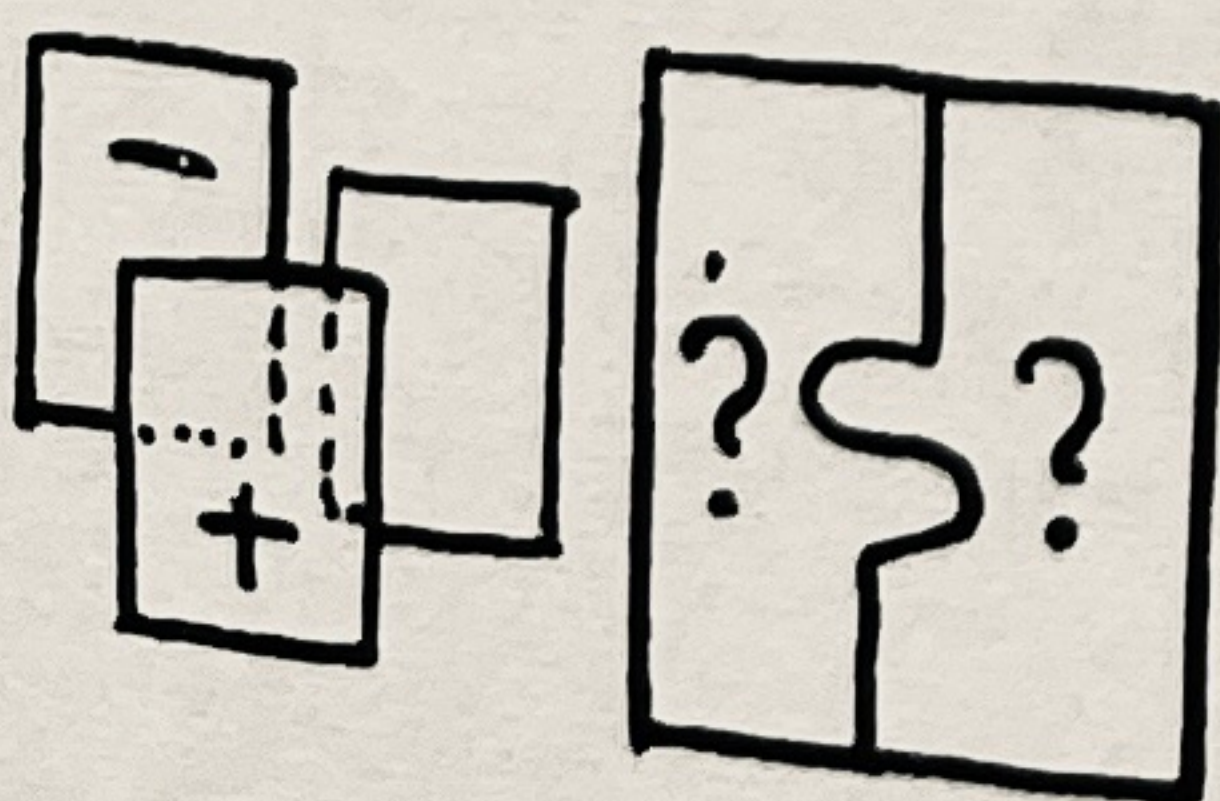
Visual comprehension involves reference to this sense, the only one which can bring us direct information about the bumps and holes of our physical world. Drawings and paintings in which any degree of this reality is achieved are so constructed that, through the eyes, they succeed in calling upon memories of kinesthetic experience.

Visual Evidence of Depth

What specific visual evidence may we discover of the existence of depth? How do we know by looking at an object that it has thickness, or that it is farther away than another object? With some of the following principles and devices we are already familiar. It is time to establish the order of their importance.



Probably first on the list should be placed the overlapping of recognizable shapes. Once our infant recognizes his mother's face, the game of peek-a-boo becomes fun. At first that part of the face which is hidden goes out of existence for him, because he cannot yet provide its missing parts from his memory. Later he knows that it must all still be there, and he comes to accept the visual image of part of a face for all of it.



Recognizable shapes are those which we remember clearly enough to reconstruct them in our own minds. When part of the shape is seen, we remember the rest of it, and conclude that there is something in front of the part which does not appear at the moment. If the shape is not known to us, it is impossible for us to be certain as to whether it is overlapped by some other shape or simply placed in close contact with it.

The very first efforts of artists to express depth or foreshortening use the overlapping of recognizable shapes, and this remains the most powerful and fundamental visual "cue" to space.

An overlapping may indicate a complete separation between objects, or a separation between parts of the same object. 'Overlapping in the outline of a human figure will mean that some part of the body is projecting in front of another part. (See the drawings and paintings of Michelangelo for excellent examples.) Overlapping appearing in the outlines of hills or mountains expresses the same thing, but on a larger scale.

Next in importance is position in the field of vision, corresponding to the same relative location on the paper or canvas. Stand before a window, looking out, and you will find that objects below your eyes and near at hand are seen through the lower part of the glass. Those below you and far away are seen through a higher section of the window. When you look at objects above eye level, this result is reversed: near objects above your eyes tend to be higher than far ones on the field of vision.

Test this principle by looking at the floor and ceiling of a room.

Most of our seeing habits are based upon experience with forms seen below the level of the eye. Everything being equal, we will judge a form which is low on the field of vision and low on the format of the picture to be near, and one that is high to be far, unless it is indicated in the picture that the higher form is definitely above eye level. If there is no horizon or other indication of the observer's eye level in the picture, the higher forms will appear to move back in space and the nearer forms forward.

The greater importance of the principle of overlapping as evidence of depth will, however, be seen if one of these shapes overlaps another. If this occurs, the partly hidden shape will invariably appear to be behind the other, no matter what their position on the field of vision.

Linear perspective is a systematic formula which achieves effects of position in space by utilizing two factors: position on the field of vision and relative size.

Relative Size: Scale

When things appear large we tend to think of them as near, when small, as far away, except when the objects involved are recognizable objects whose size is well known. Often objects of uncertain or variable size such as clouds or hills, may be judged much nearer or much farther away than they really are until one recognizes an object in a clear relation to them which supplies the evidence for scale. The need for comparing objects of uncertain size with objects of known size is recognized by architects and artists. Architects often include figures in



their drawings of buildings to "give them scale." A wagon track on a distant hill presents fixed and known width in a picture. Objects such as trees are variable and are only relatively helpful in establishing scale. If we see small trees on a mountain it may be because the mountain is really very large, or merely because the trees are very small.

A false effect of great size is often given by a building in which the windows appear unusually small, just as buildings with very large openings seem smaller than they really are. For establishing scale we cannot entirely depend upon doorways, windows, or other architectural details, since they do not always obey the usual conventions as to size. In practice, however, we usually depend upon the preponderance of past experience.

If we place a shape representing no definite size of the subject--a circle or square, perhaps--upon a sheet of paper, it will take on a size effect by its relation to the expanse of paper around it. If it crowds the borders it will seem large; or small if the expanse of paper is much larger than the shape itself. If now we place another form, also free from association with any idea of given size, alongside it but somewhat smaller, the first shape will immediately seem larger than it did before, and the second shape smaller by virtue of being seen alongside a larger form. If we should now remove the first shape, the other would not seem quite so small.

This effect is still operative, but somewhat lessened, if we are using shapes of recognizable objects of known size.

Linear Perspective

The method of linear perspective is based on the fact that an object appears to diminish in size as it recedes into space. Although it is true that this offers a means of creating space effect in a picture, when used alone it is not by any means a sure way. The attempt to follow its formulae strictly often produces illusions which are visual falsehoods.

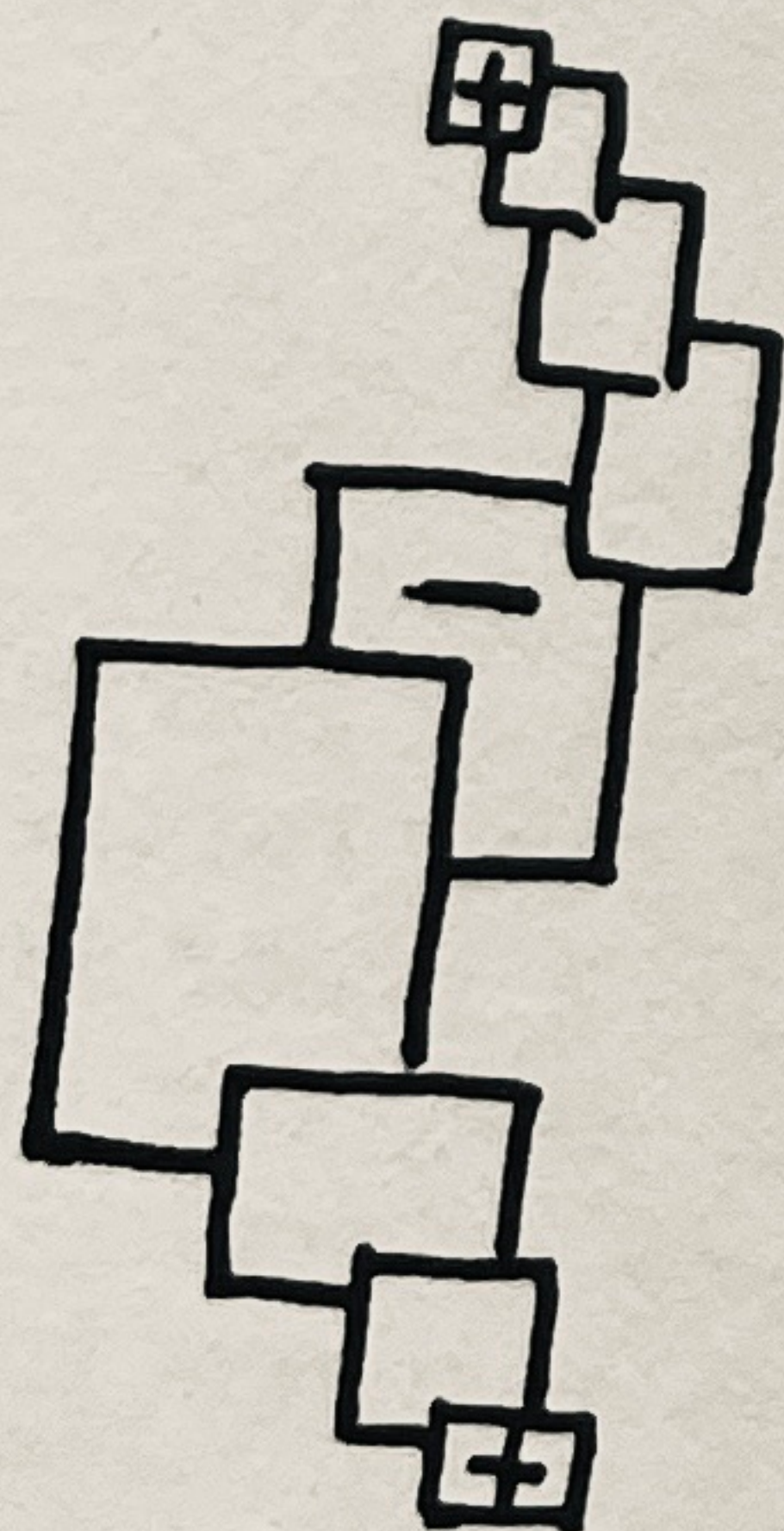
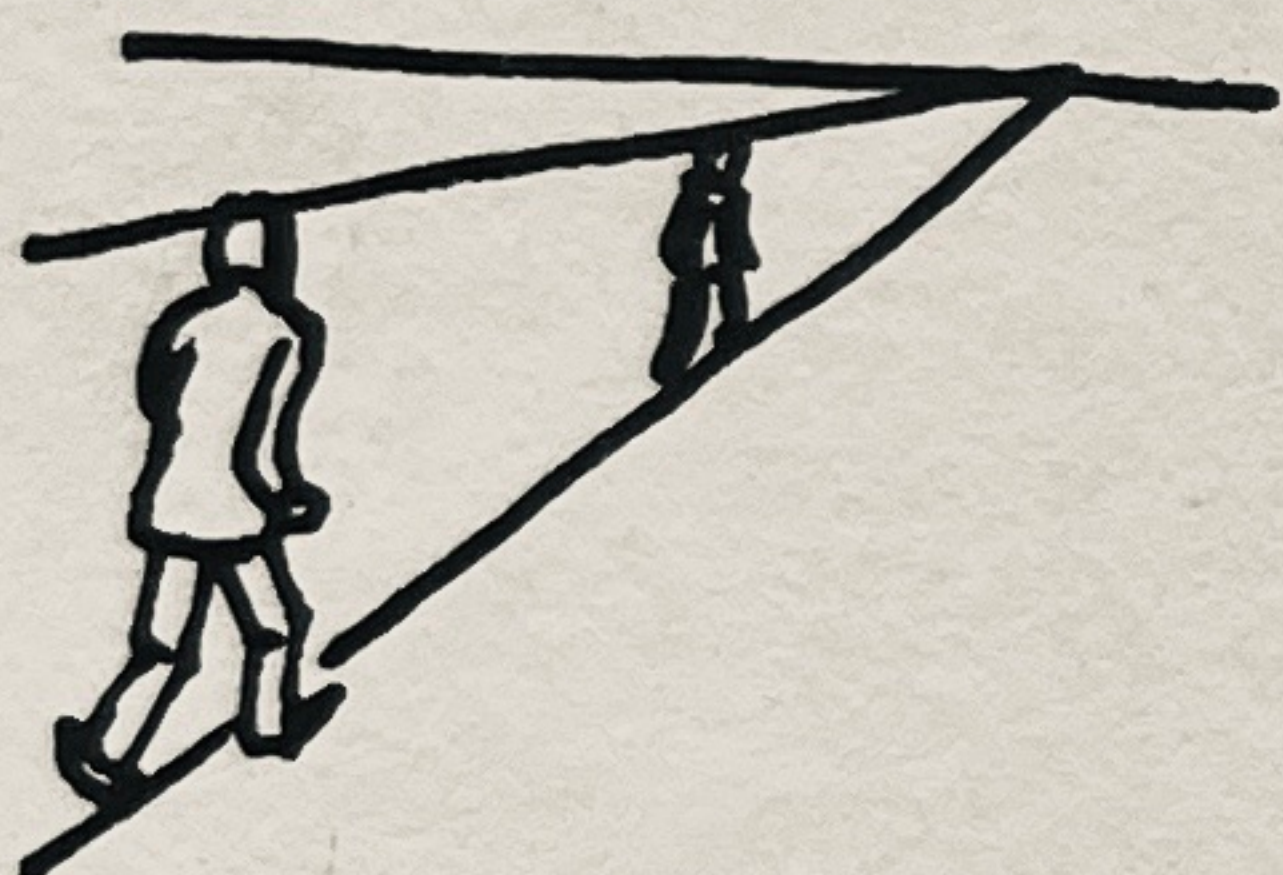
For a long time artists thought that this method was their most important inheritance of the graphic discoveries made by the great artists of the Italian Renaissance period. Now, however, linear perspective is considered as only one of many devices for achieving the "effect of space where there is no space," as Leonardo da Vinci put it.

Numerous books have been written about linear perspective, and they may be found in most public libraries. In reading them a student must remember that contemporary thinkers on art no longer lay stress on linear perspective methods. Indeed, they often avoid their use entirely, depending upon those means of achieving space which have been described in these lessons.

There are, however, some branches of applied art in which a knowledge of linear perspective is genuinely useful. The necessary principles will be given in a succeeding lesson, along with diagrams, so that students of architecture and others who use these mathematical formulae in the creation of working drawings may understand their relation to the principles stated here, and to their own work.

Let us undertake a series of experiments with these various methods of space-building, on the flat surface of a piece of paper.

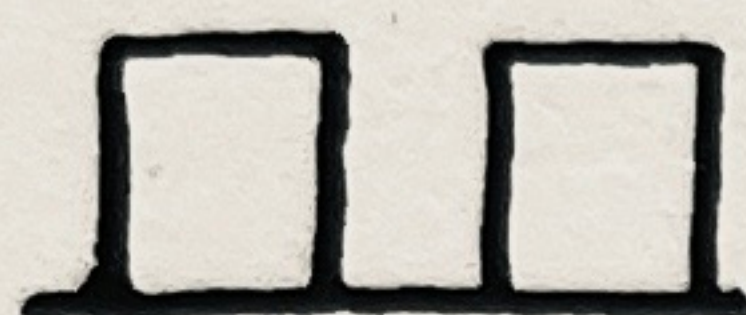
Notice that no matter what changes we may make in the sizes of objects, if their shapes are known and recognizable they will obey the



overlapping principle: if they overlap, they seem to be in front, no matter how small their size; if they underlap, they are back in space.

Exercise (a).

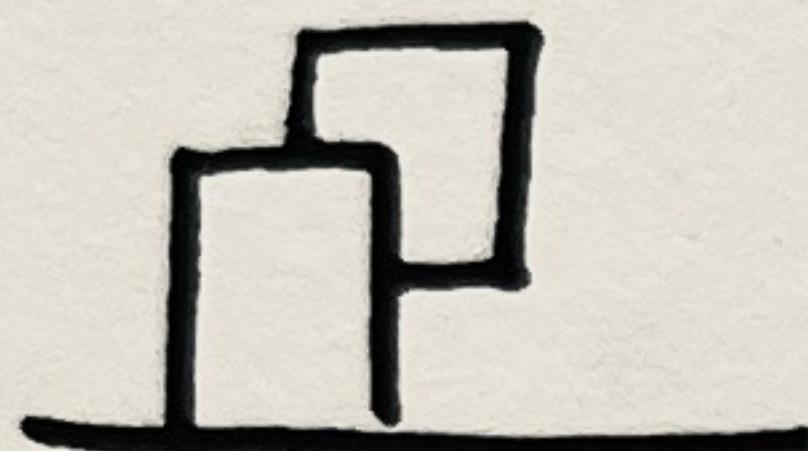
(1) Draw two squares of the same size, with horizontals parallel with and equidistant from the bottom and top of the sheet of paper. They will appear to be parallel with your face, and on the surface of the paper.



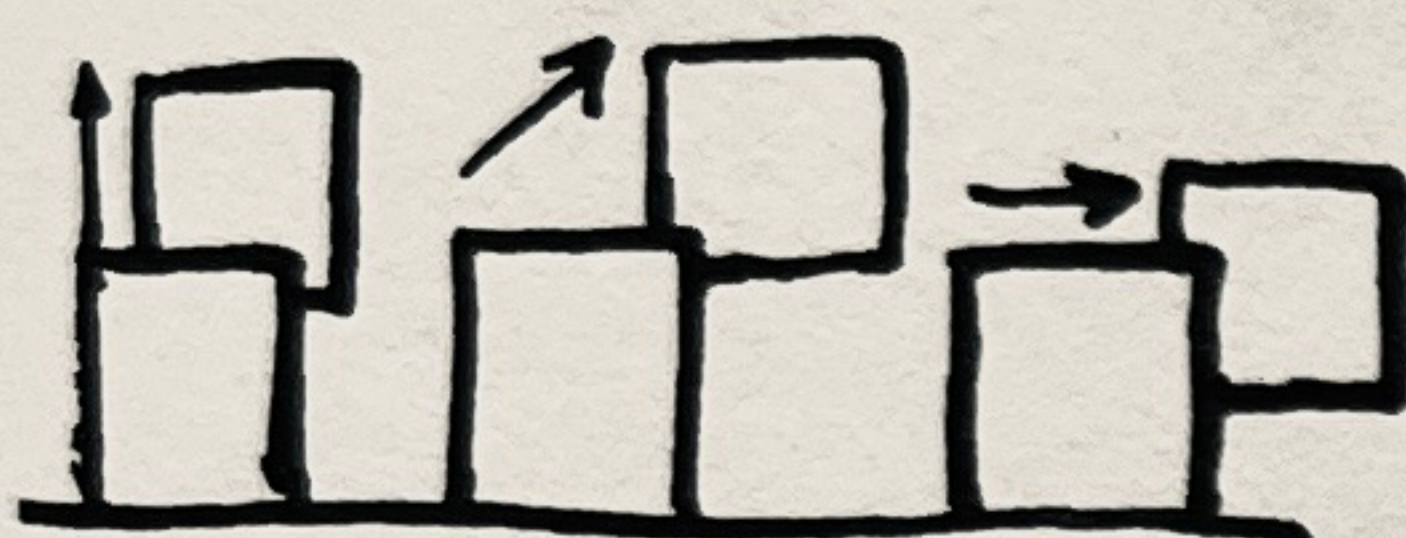
(2) Draw the two squares again, but this time raise one of them so that its bottom horizontal, if continued, would cut the lower square approximately in half. The upper square will appear to be farther back in space.



(3) Draw the two squares so that the upper one is overlapped by the lower one. It will now seem to be securely fixed in a position back of the lower square.



(4) Try different positions of these two squares as in (3), showing the effects of (A) moving the back square along the diagonal, (B) moving it along the vertical, and (C) moving it along the horizontal path with relation to the forward square. Never move it so far that it is not overlapped. It will be seen that as the diagonal, horizontal, or vertical distance increases between the two centers of the squares, so long as the front square still overlaps, the amount of space between them seems to increase. If the diagonal, horizontal, or vertical distance decreases, the effect of space between the two also decreases.



(5) Try the above with two squares which are not the same size. Try it with the smaller square in front and overlapping, and then with the larger square in front and overlapping. It will be found that when the smaller square is behind, there is some increase in space effect, but that with the smaller square in front and overlapping, smallness in itself is not enough to reverse the relative space position of the two. The overlapping square remains in front, no matter how small it is.

Exercise (b).

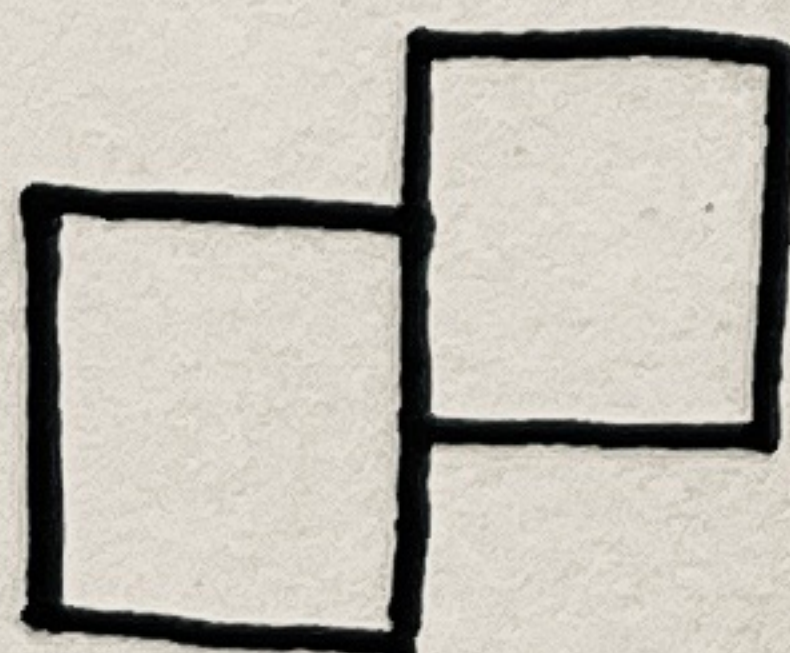
(1) Begin again with squares of the same size placed side by side, but not touching.



(2) Bring them together in a second drawing so that they have one side in common. The same line should stand for the right side of the left hand square, and the left side of the right hand square. Notice that the two squares now seem a part of the same figure.

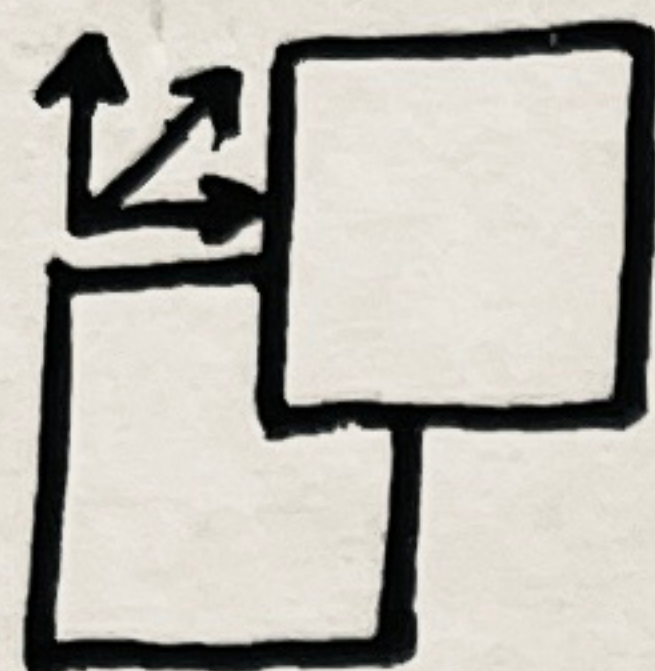


(3) Slide the right hand square up from its position in (2) so that part of its left side is in common with part of the right side of the other square. The bottoms and tops of the two squares are no longer on the same level, but the sides which face each other coincide in part. It will be seen that although it is possible to consider the upper square as farther back in space, it is equally possible to consider it as remaining on the same flat surface with the lower square.

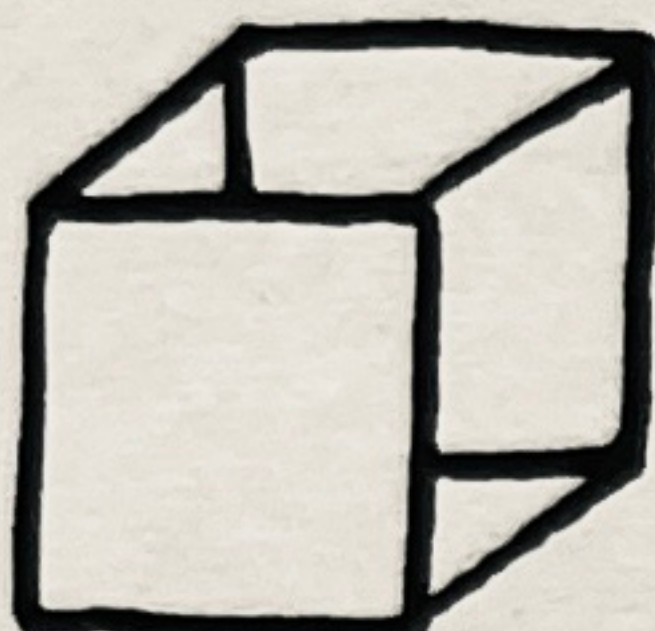


This is an example of equivocal space expression, a doubtful indication of space where the factors making for depth are negated by equally strong factors making for flat pattern effect. Such devices have long been used by artists, especially mural painters, when they wish to keep a drawing flat and "decorative," rather than predominantly spatial.

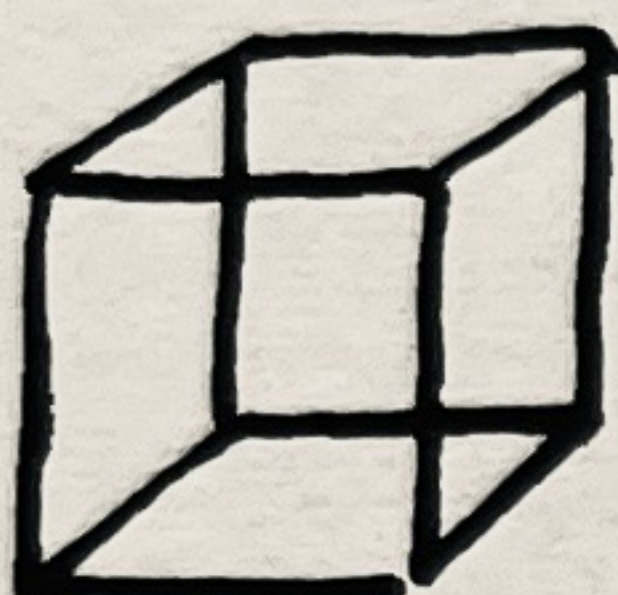
BASIC PRINCIPLES OF DRAWING



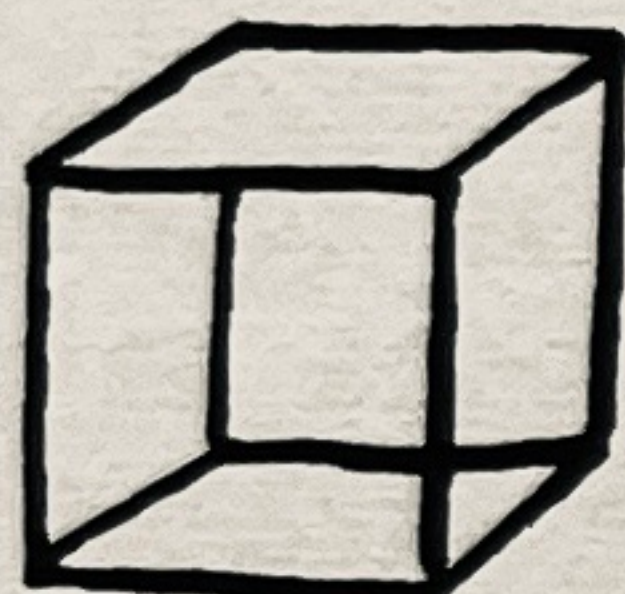
(4) Go back to Exercise (a), number (4), and repeat it, but this time with the upper square overlapping. You will notice that space effect is again achieved, but this time it is space above eye level. The higher the forward, overlapping plane, the farther forward it seems to come; whether it moves along the diagonal, the horizontal, or the vertical, the farther it is from the plane overlapped the greater the effect of space between the two planes.

Exercise (c).

(1) Draw two squares of the same size in the diagonal position, with the upper square overlapped and the lower square overlapping. Connect all visible corresponding corners of the two squares with lines. You will now have the effect of a box with solid front and back, but with open top and sides.



(2) Repeat the above drawing and complete all the lines which mark the four corners. You will now have a transparent cubical shape.



(3) Try taking out lines and parts of lines to get these effects:

(A) An opaque (solid) top and bottom with open sides.

(B) Opaque sides and open top, bottom, front and back.

(4) Try another series, leaving the following elements opaque:

(A) top and left side,

(B) front and top,

(C) top and right side,

(D) bottom and back,

(E) bottom and right side,

(F) bottom and left side.

In our next assignment we shall apply these principles to the use of spots of paint, using the brush and watercolor.

Part I • Assignment 6

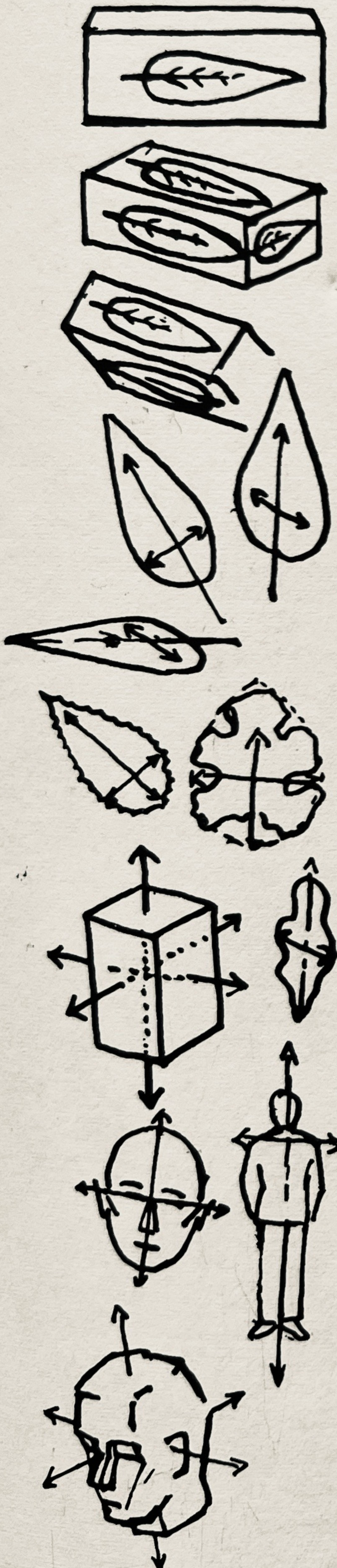
Introduction

Horizontal and vertical lines in a composition mean first of all flatness, or position parallel with the face of the observer. Secondly, horizontals may be used to express repose or comparative absence of activity, while verticals may mean any idea having to do with upward or downward, such as aspiration.

Diagonal lines bring into a drawing ideas of recession in space, of activity rather than rest, of twisting and turning away from the flat surface of the paper.

We have discovered, then, something about getting the effect of relief or depth in space, on a flat piece of paper which actually has no thickness.

We have learned to tip and turn objects away from the flat surface of the paper. Let us try it with some forms which are slightly more complicated than a shoe box or a book.



Exercise (a).

(1) Pin a leaf on the front of your shoe box so that the length of the leaf coincides with the length of the box. Draw it so that it seems to lie flat on your paper.

(2) Turn the box so that the plane on which the leaf lies is rotated away from you. Draw the box and leaf in this position.

(3) Turn the shoe box and prop it up so that it stands on one corner and is both tipped and turned.

(4) Try drawing the leaf alone so that it shows it is in this tipped and turned position.

In these drawings, the outline or silhouette of the leaf will not have horizontals and verticals like those of the box. But the axis, or average direction of the entire shape of the leaf, will correspond to the axis of the entire shape of the box plane on which it lies.

All forms may be said to have axes. The earth has an axis through the north and south poles. The axis of an apple is on a line from stem end to flower end. That of a standing man is on a line from the top of his head to a point between his heels.

The longest and most obvious axis of a form is called its major axis. Our leaf, if it is a long leaf, has its major axis from stem to point. Along the greatest dimension in width lies the secondary or minor axis. If the object is three dimensional, like our box, it has a tertiary axis which is its greatest thickness or depth. We need the concept of these axes to help plan the positions of forms in space, especially when their silhouettes are irregular.

Exercise (b).

Repeat Exercise (a) with some other curved or irregular forms. Include a sheet of these sketches in your assignment.

Value Drawing

Paintings are built up out of spots of paint which stand for spots of light. It is not our aim in this course to go into the intricacies of color, but it is well to realize now that painting with color is really a special kind of drawing, and involves a knowledge of the basic principles of drawing as much as it involves the special knowledge of color.

The kind of painting which we will do here will be of the kind called wash drawing, or monochrome watercolor painting, which is drawing by means of values and of the lines created by the differences between them. The Chinese and Japanese have developed great skill in this particular kind of drawing, perhaps because the brush and a sort of watercolor called sumi are used in all their everyday writing. This has become a natural instrument of expression for them. It is interesting for a Westerner to try out their tools to see what he can do with them, but he will seldom develop the manual skill shown by a Chinese or Japanese artist. Since most of our writing is done with pencil or pen, line expression is apt to be easier for us.

The preceding assignments have been directed largely to line drawing, first because line drawing utilizes tools familiar to the beginner, and second because the decisions it involves are basic to other kinds of drawing. We now begin work in mass, or value, or tonal drawing, as it has been variously called.

Drawing with values depends upon lines too, but the lines involved are not drawn as single lines: they occur at the edges of spots or planes of light, dark, or grey.

Charcoal Drawing

Of course there are, as we have said before, art technics which use both line and value in combination: crayon work, charcoal work, and even soft pencil may conveniently employ values. As the point of a pencil or crayon gets softer and broader, it becomes more and more useful as a tool for the creation of values, and less and less useful (unless continually sharpened) for the production of lines. Soft, thin sticks of charcoal, sometimes blended by the use of "stumps" of chamois or rolled paper, softened or erased by the use of a square of chamois leather, are time honored tools for the study of value drawing.

Most art classes employ charcoal, because when properly used it allows easy correction, erasure and change. For erasing, a "kneaded" rubber eraser is used, or the favorite device of the older artists, soft "bread pills" pulled from the center of a French loaf.

The disadvantage of charcoal drawing for our purposes lies in the fact that it is best adapted to fairly large sized work. Especially prepared charcoal paper comes about nineteen by twenty-five inches in size, and charcoal is often used on even larger sheets in making preliminary drawings, called cartoons, for large mural paintings.

The very fact that charcoal is so easily manipulated and changed makes it difficult to "fix," so that it does not rub off. Charcoal is fixed by spraying with a two per cent solution of white shellac in alcohol, sold under the name of Fixative or Fixatif. The finished drawing must be sprayed lightly several times, letting each coat dry before applying the next. Even then the darker areas will dust off to some extent. So, although charcoal is an excellent medium for studying line and value drawing, and for sketching in such a manner that one may improve and change as one works, it is not a good medium for shipping or sending.

Monochrome Watercolor

For our value work we shall use monochrome watercolor washes because, once dry, the pigment adheres well to the surface upon which it has been painted, the drawings may be of a size convenient for mailing, and because it is highly desirable for the student to begin the use of the brush as early as possible.

By repeating the exercises until they can be executed with facility we may avoid the necessity for changes in the final draft. Also, light pencil lines, later to be erased, may be used as guides in execution.

Caution should be exercised in erasing paper which is later to take a wash of watercolor. If the erasure is so deep as to tear the surface of the paper, the erased area will take up more color than the surrounding areas and appear as an unexpected spot in the final rendering.

Watercolor is sometimes called a disciplinary, or inflexible medium, because it is not easy to change it once a stroke has been set down. It therefore requires careful planning and thinking, even though the final result may appear quite spontaneous and free. Truly "sketchy" and "free" watercolor work is done only when the painter has mastered the use of his tools. Once this is achieved the method becomes one of the most direct and spontaneous of media for

the expression of the painter's ideas. At first, however, he must subject himself to the discipline of thinking before he acts. Until he knows just what he wants, and knows his medium well enough to take advantage of accidental effects, he cannot expect to execute watercolor quickly and spontaneously.

The following exercises are calculated to develop the necessary mastery of brush and paint, and will serve also as a review of the principles which have been studied to this point.

It is comforting to know that great dexterity is not essential for the making of wash drawings which may be called worthwhile. But more practice will be necessary for brush work than for the use of the pencil, so do not be discouraged if you must repeat these exercises a number of times before you execute one that you wish to send in for criticism.

Remember, you cannot correct mistakes in this medium, so plan and think before you set down your brush. You may want to make a light pencil diagram or a thumbnail sketch on another sheet of paper. Then act as quickly as you can to carry out the strokes which you have envisioned. Make this a habit, and you will gain in sureness of expression and in spontaneity at the same time.

If you wish to do some of the exercises in charcoal as well as in watercolor, this will be very good for you, since the charcoal medium is not quite so dependent upon dexterity. Do not attempt to send charcoal drawings through the mails. The corrections which you get on your watercolor exercises will apply very largely to anything you do in charcoal. Remember that charcoal drawings must be considerably larger to be executed easily.

Exercise (c).

For the next part of this assignment, then, lay aside your pencil, and take up the brush and watercolor which we have not used since making the value scale. Here we discovered that the brush and paint were more useful for making spots than for making lines, excepting in large works. Let us find out something about spots, or as we shall learn to call them, planes.

We have found that by overlapping planes we may create space effects. When planes overlap, there must be an edge visible between them in order to avoid losing the effect of overlapping. Hitherto we have used drawn lines. Now let us superimpose spots of paint of different value. If the value is different enough, our line will be visible where the spots come together, and we shall not have to draw it.



(1) Take up some watercolor in your brush and make a spot, a puddle of paint, somewhere around an inch or so across. Let it dry. It will look somewhat lighter after it dries. This is true of most watercolor paints, and we must learn to compensate for it by painting the spot darker than we want it to look in the finished work.

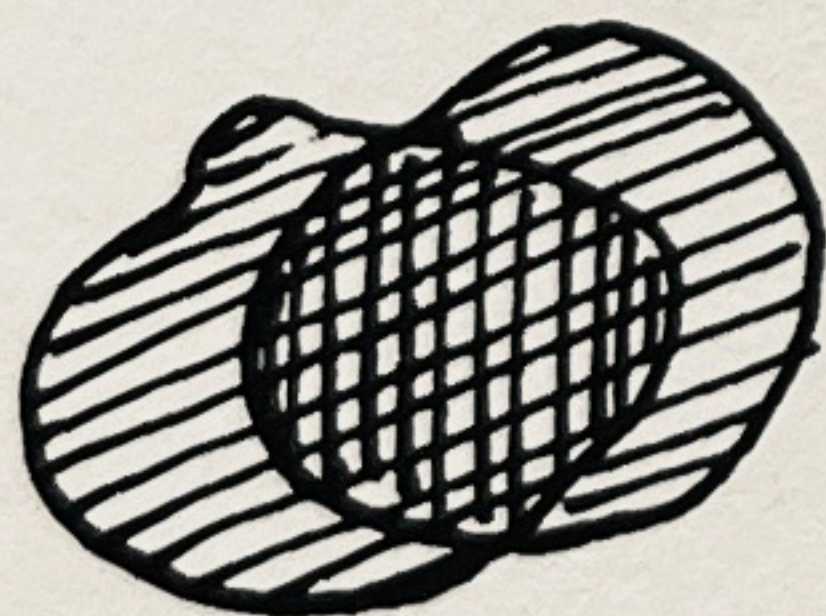


Fig. 1

While the spot dries prepare for the next exercise, in which you will use an apple or an orange, or a ball of some sort. We are going to do the same things with spots of paint which are just spots, as we shall do with spots of paint which are in the shape of an apple.

Prepare to work at the end of the table as before, and place your apples at the other end.

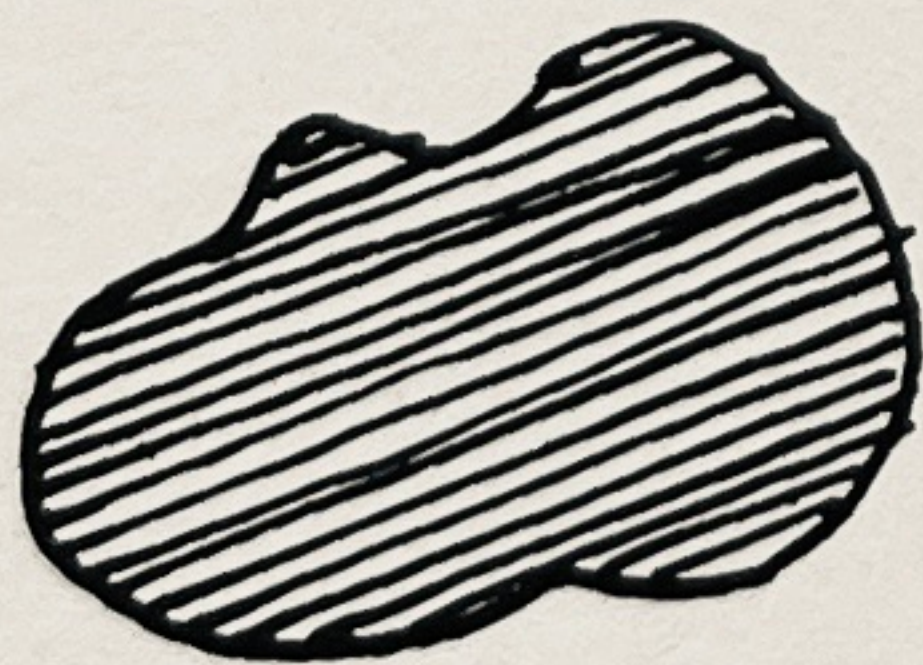


Fig 2

By now your spot of paint should be dry. Without scrubbing the brush so much on the paper as to soften the paint film of the first spot, lay another spot of the same value alongside it and overlapping it. If you have not disturbed the paint film of the first spot, but have glazed it over properly with the second coat of paint, you should have something that looks like Fig. 1.

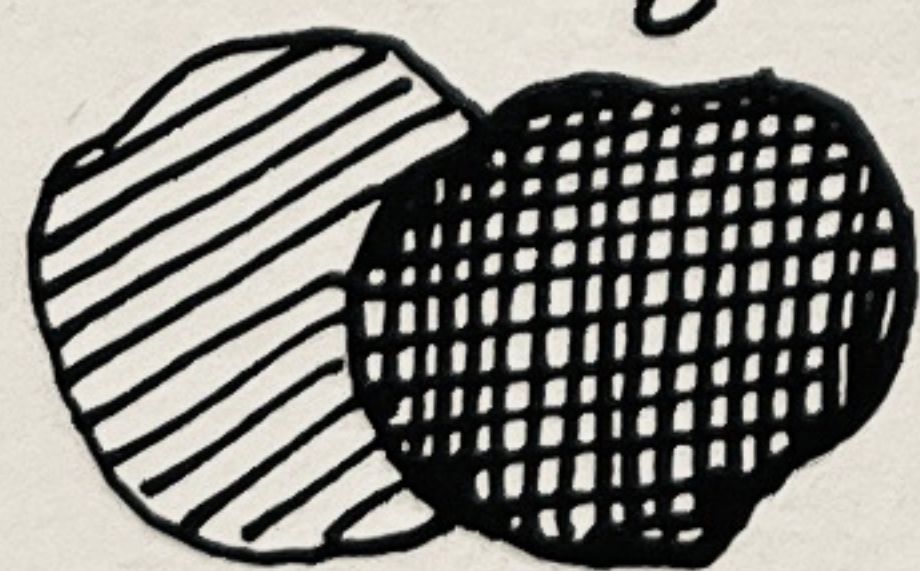


Fig 3

(2) Now do the same shape, the outside silhouette of both spots, but this time do not wait for the paint on the first spot to dry. Fill out both at once. You will get a shape like Fig. 2.

(3) Put down a spot of paint which is rather light in value, let it dry thoroughly, then paint another very opaque and dark spot over it. The result will look like Fig. 3.

It will be seen at once that only in the last exercise did we get an effect of overlapping, and hence a feeling that the dark plane was in front. In the first case both outlines were seen and it was easy to think of either of them as forward or back. The space expression was equivocal. In the second case there was no sure evidence of overlapping, and with no other visible evidence of space the shape would be accepted as a flat one.

(4) Try the first pair of spots again, this time making one more opaque than the other; use just enough color so that the outlines of both spots show a little, but one much more than the other. Here you will get the effect of one spot in front, but transparent, so that you see the back spot through it.

Knowledge and control of individual spots of paint are very important for successful painting.

Exercise (d).

Now try spots of various shapes:

You discovered in drawing a leaf pinned on a box that you could turn it away from you and tip it if you planned its axes properly.

(1) Make a leaf shape with your brush. If you can remember how the veins of the leaf go, you may leave the paper showing in lines to stand for these veins, which are often lighter in value than the leaf.

(2) Try painting this leaf in different tipping and turning positions. Use only one value, without attempting any shading or modulation. Include three of your best leaves painted from imagination in your assignment.

(3) Try executing a number of the simple shapes which you have previously done in line, carrying them out in a single flat value of monochrome wash. Think of the axes of the paint spots as you put them down.

Exercise (e).

Arrange two apples before you at the other end of the table, so placed that one apple is seen as a shape overlapping the other. We are not concerned in this exercise with the color of the apple nor with any shadows on the apples, but only with their outline or silhouette.

(1) Paint in the apples so that one is seen against the other. You will find that if the apples are the same in value you must leave a white line of paper between them to keep the effect of overlapping.

(2) Try painting them different values, quite arbitrarily so far as their real color is concerned, so as to show that one is in front of the other. This result will be similar to your third exercise with the two spots.

Both of these methods are used by artists to separate shapes which happen to be the same in color and so seem to run together when one looks at them. If the artist wishes to show that they are separate forms he changes their colors to indicate overlapping.

(3) Place your apples in such a way that only a little of the apple in back shows from behind the forward one. Try to arrange them like Fig. 3e, so that the silhouette of the back apple seems to join that of the forward one smoothly, at a very acute angle. Paint in the two apples in different values, the back one lighter.

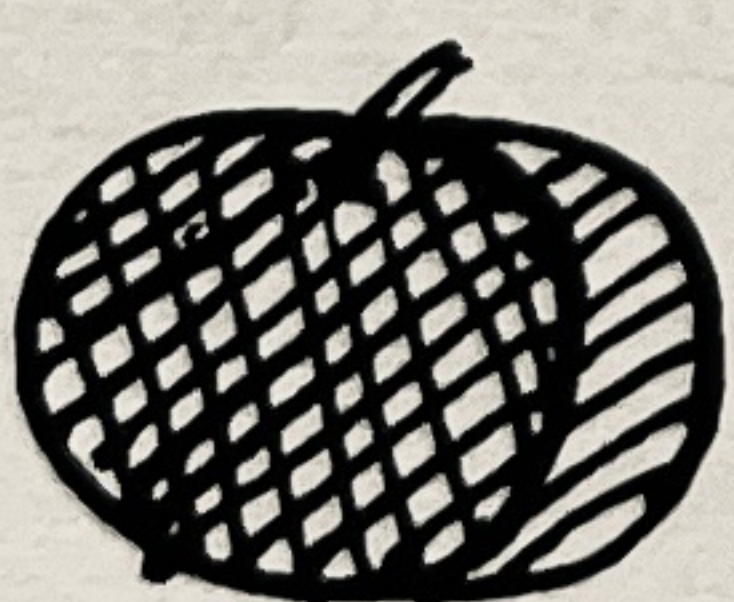
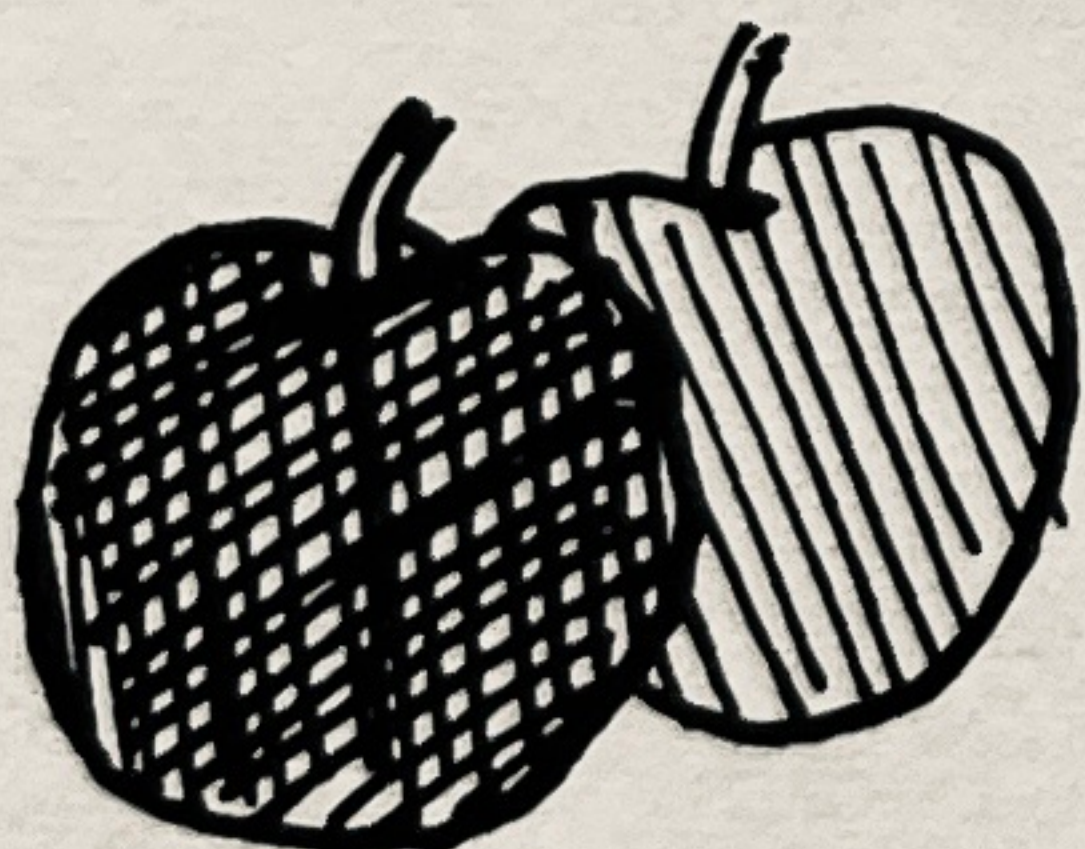
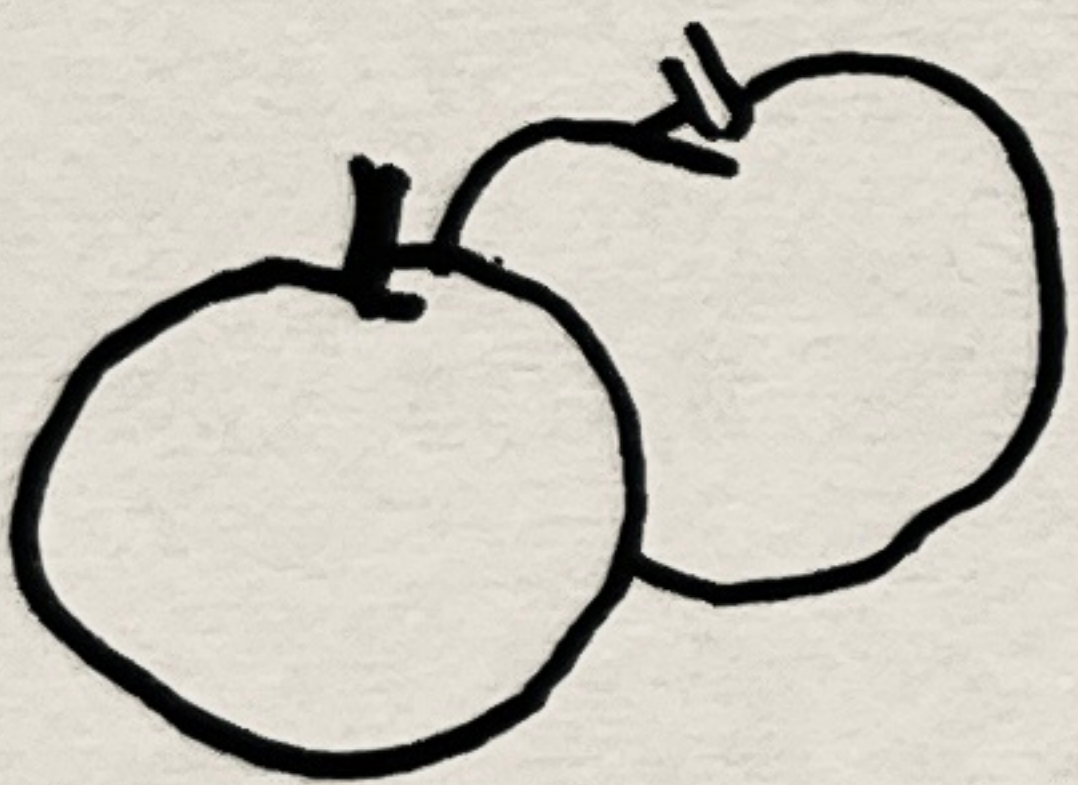
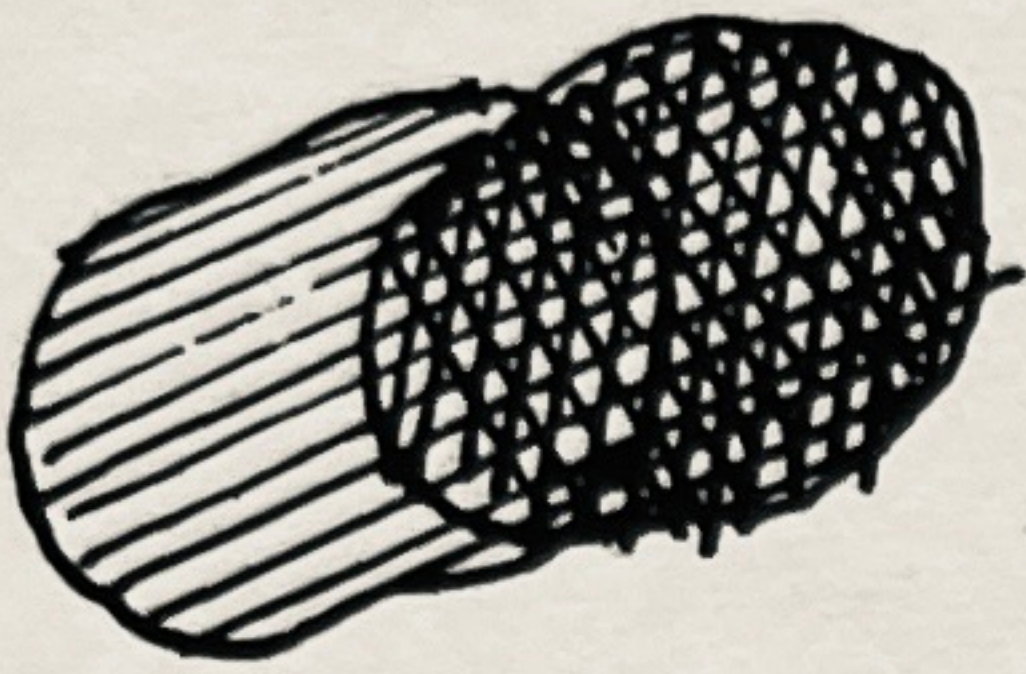


Fig. 3e



If the outlines of the two apples flow into each other smoothly enough, the part of the back apple which shows will not seem to be behind, front apple.

(4) Try to arrange the apples so that their outlines meet but do not flow together. Get the angle of intersection as near to a right angle as possible. Paint them in as in (3).

If you have arranged your apples so that there is sufficient contrast in line direction at the point of juncture of the outlines, the separation between them will be evident. Difference in color or value is not so important as definite overlapping of outlines, in the separation of forms in space.

(5) Prove the above principle to yourself by trying another drawing of the apples with outlines flowing into each other, but reverse your value scheme, so that the back one is now darker. It will remain only a bump on the forward apple, so long as the outlines flow together.

Exercise (f).

Put aside the apples and place a cup, vase, or other simple form which is round, at the other end of your table.

(1) In a square about six by six inches draw the silhouette of the cup. Draw in a line representing the end of the table against the wall, arranging the cup so that this line occurs somewhat below the middle of your square. Let cup, table top, and background be as simple as possible. Avoid pattern and ornament for the present. If necessary place plain sheets of paper under and in back of the object. If possible arrange illumination to come from directly in front of the subject over your head.

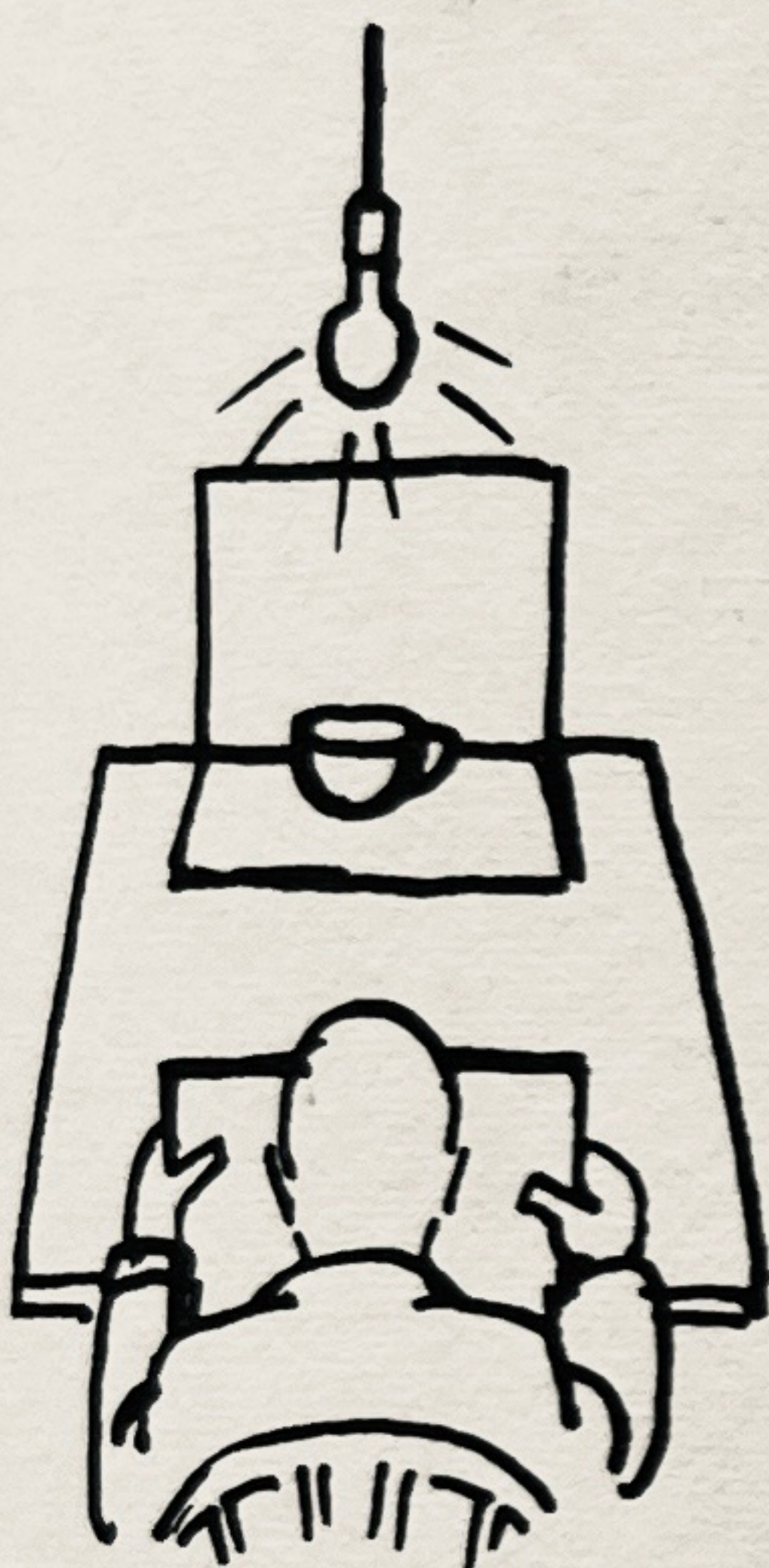
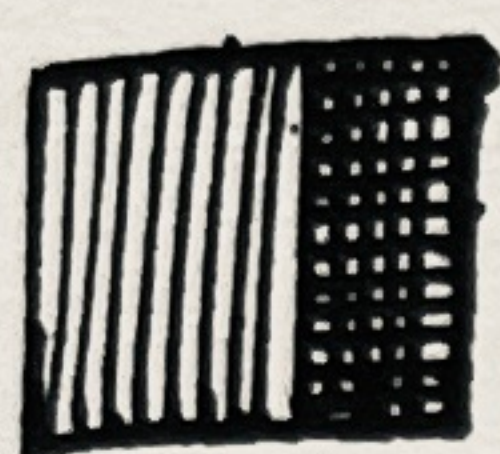
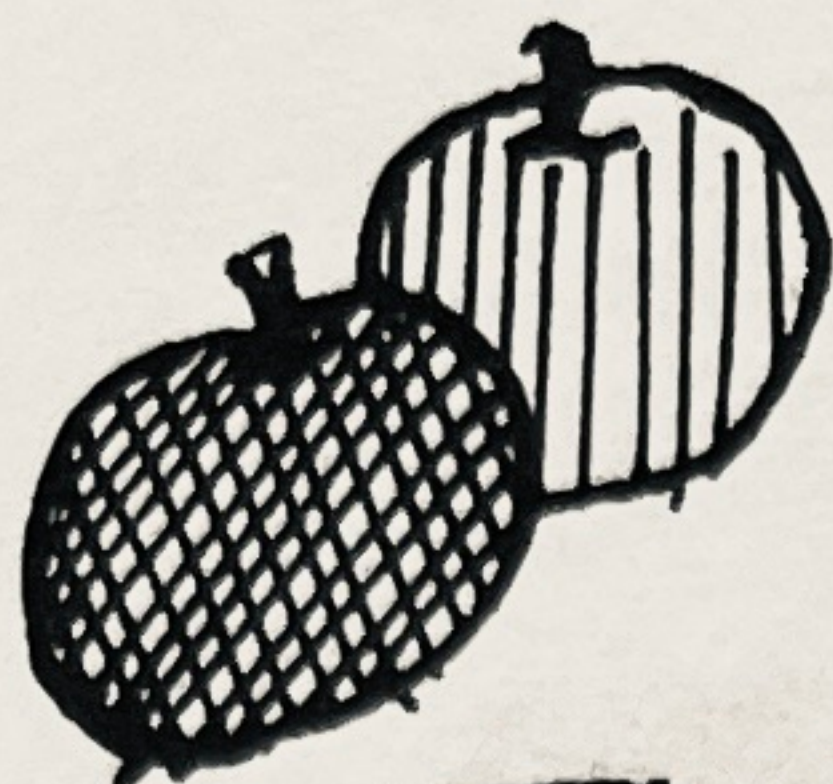
Look carefully at the values of your subject. Disregarding the other color qualities of the cup, wall, and table top, how light or dark are they in terms of your value scale? You may find that your cup is very white, your wall middle grey, and your table dark, perhaps almost black. Choose suitable values from your scale and fill in the areas which correspond to them with similar mixtures of paint.

For this drawing and the next one, ignore shadow effects. What we want is the silhouette of the cup in contrast with the values of the wall and table top. If these are too close in value, you will be unable to see the difference between the three planes. Your value scheme will not be a good one because it will not bring out the lines necessary to explain the form of the cup and the distinction between table and wall.

(2) Make a similar wash drawing of the same or another object, choosing an arrangement which will show it dark against a background predominantly light. The wall and table top areas should be in two values near white but sufficiently contrasted to allow the line between them to be seen. You may leave the back wall paper-white if you wish.

(3) Try another wash drawing of the cup, but this time see that it is lighted by a strong light from the left side. A white or very light colored cup will be best for this. Attempt to match the light and shade on the cup to your value scale. You will find that most important is the gradation of values from light to dark, from left to right.

Secondarily, especially if the cup is a shiny one, there will be reflected lights in its surface which may appear to break up this gradation. Think of these reflected lights as your enemies at first and avoid them, for they may seem so important that you will be tempted to



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exaggerate them, thereby losing the most important effect (from the standpoint of expressing the form) of gradation. Photographers often find it necessary to powder the shiny surfaces of metallic objects, to avoid recording distracting reflections.

You may have tried this matching of the gradation once, only to end with a drawing in which the edge between light and shadow is a hard or sharp one, unless you have proceeded in the following way:

Take up as black a black as you can on your brush, and paint in a spot which corresponds to the darkest part of the cup. When you are near the place where the dark seems to become lighter take up less paint and more water on your brush. Keep this up until you approach the place where the cup is quite light in value. By this time you will have no pigment to speak of in your brush, only water. Use this water to soften the last previous stroke which contained some pigment, to make it blend with the white of the paper.

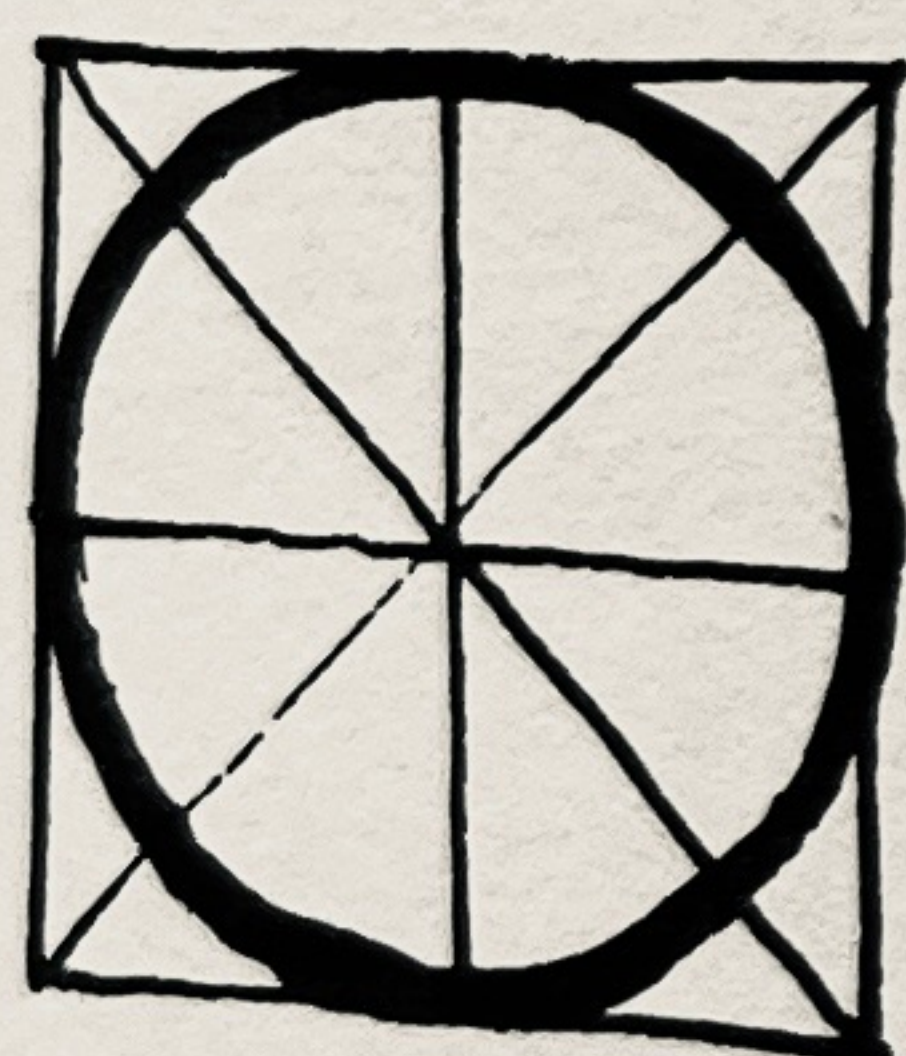
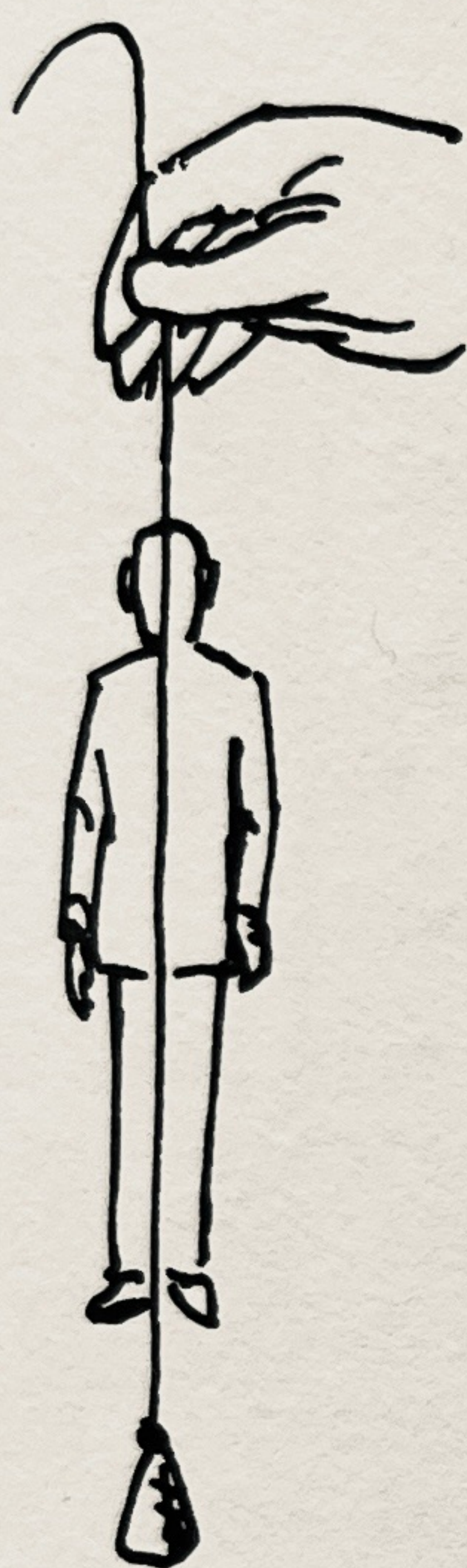
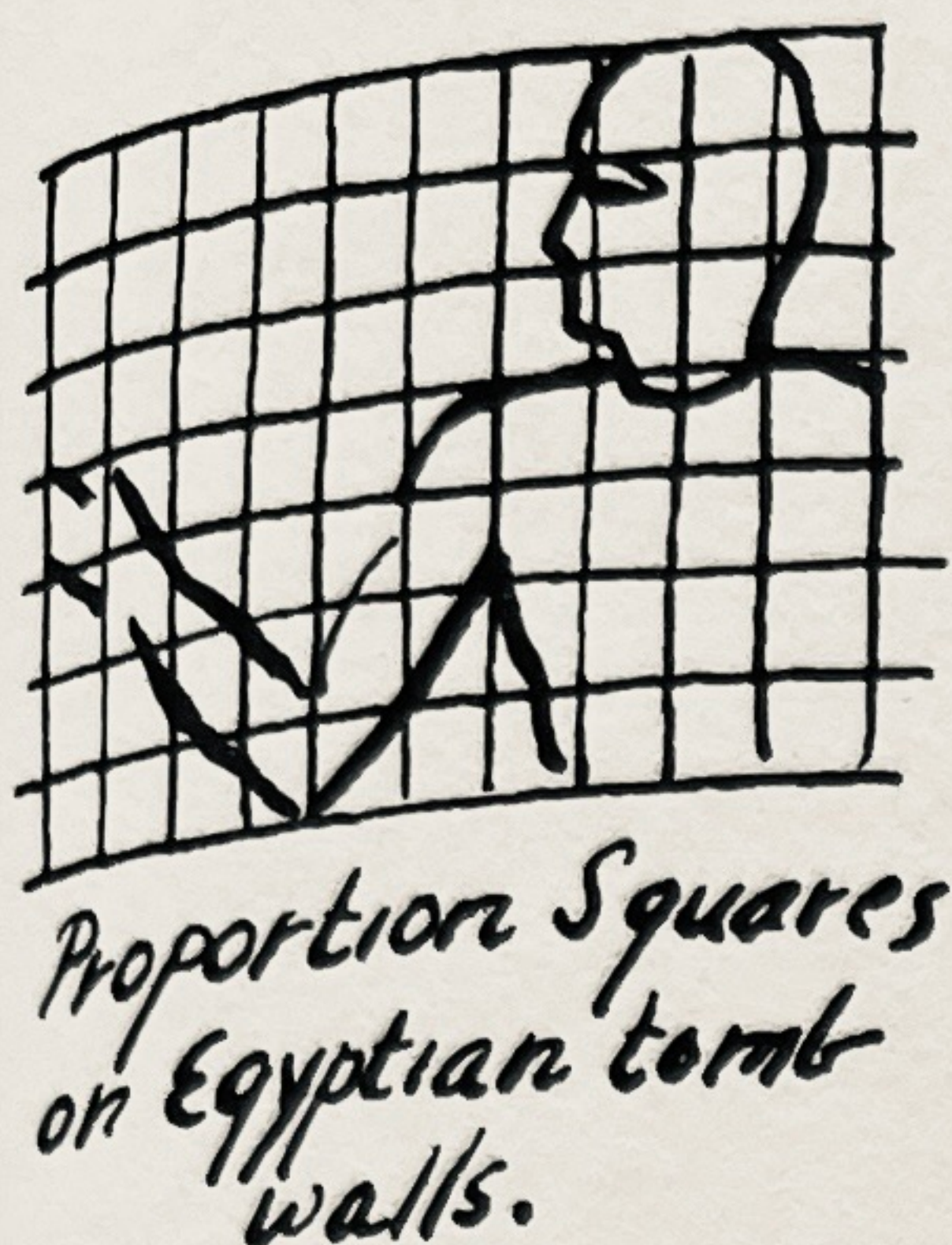
In the next assignment we shall consider the construction of more complex curved forms by reference to simple ones.



Part I · Assignment 7

Introduction

Curves in Space



We find evidence that artists from earliest times have aided themselves in rendering complicated forms by first "blocking in" such a form in simplified terms of straight lines and right angles, and then cutting it down progressively to the final outlines.

The Egyptians laid out their flat wall decorations on a pattern of squares made of vertical and horizontal lines, and were able to judge any variations from the straight, as well as the starting and stopping places of smooth flowing curves, by reference to these squares.

The Renaissance artists, when they wished to copy a figure, held a plumb line before it to find the points which were in a vertical relation to each other.

Curved lines are more difficult to visualize clearly than are straight lines. They involve many directions instead of one. In some curves the change takes place according to mathematical law; other curves have infinite variations. We are able to comprehend the complex ones only by relating them to simple ones.

Perhaps the simplest of all curves is the circle, because it changes direction at a constant rate. It is comparatively easy for us to decide whether a circle is truly round, but still easier to judge it by relation to the lines of a square. As we know, vertical and horizontal lines and the right angle which they make are the easiest of all lines to visualize. In addition, we were aided in drawing them on the paper by referring to the edges of the sheet.

Exercise (a).

Let us try blocking in the outline of a milk bottle placed on the table before us, its center level with our eyes.

Look at the milk bottle and decide how many times its height might be divided by its width. Draw a base line to stand for the width. Imagine this base line turned vertical and placed alongside the height of the bottle. Does it go up halfway, or somewhat less? The milk bottle at which I am looking is about two and one-half times as high as it is wide. I construct on the base line which I have drawn a vertical rectangle of the same proportions.

Again there is a mechanical crutch which you might use to correct your eye measurements. Take your pencil and hold it at arm's length between you and the milk bottle so that the point of the pencil touches between you and the milk bottle at the left side of the bottom, and your visual image of the bottle at the left side of the bottom. Move your thumb the pencil parallels the horizontal of the bottom. Now turn along the pencil until it marks the other side of the bottom.

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the pencil vertically, holding your thumb at this point which marks the width. (Be sure your arm is still fully extended.) Lay the pencil against the side of the visual image of the bottle. As I look at my milk bottle with pencil held at arm's length, the point of the pencil comes just up to the beginning of the curve of the bottle. I mark that point with my eye while I move the pencil up vertically until my thumb on the pencil comes exactly to that place.

The point of my pencil now lies just above the place where the curve of the bottle straightens out to form the vertical of the neck. I fix that point with my eye and move my pencil vertically again. I find that the neck is slightly over half a width high, from the point where the curve stops.

I discover that the width of the mouth of the bottle, measured in the same way, is exactly half the width of the bottom.

On my paper I establish these points by means of horizontals and verticals, after which it is easy to draw the curves in their proper places.

Let us now take up again the matter of psychological accuracy. Why are we not entirely satisfied with the results of this measuring? Composition. The effect of the format on height and width.

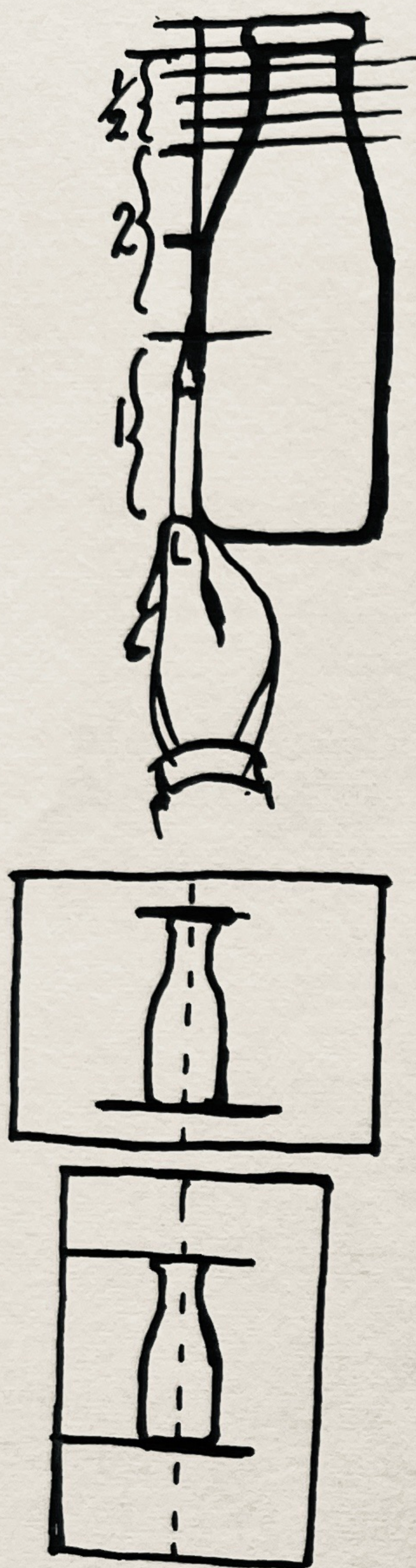
In a complete pictorial composition a form is always seen in relation to other forms. Earlier in this course we demonstrated the principle that a large object placed in relation to a small object made the small one look smaller and the large one larger. Now let us see what happens when we draw our milk bottle on a horizontal sheet of paper, where the spaces at the sides are wide and the vertical length of the bottle is crowded by the top and bottom of the sheet.

On a second sheet of paper, turned so that its long side is horizontal, make another drawing done in the same way as the first. Notice how much shorter and wider the bottle seems, when compared to the first drawing.

We must adjust the lines of our drawing of an object to the shapes against which it is drawn, in order to present a true idea of its proportions. This may be said of all forms surrounded by a frame or drawn against other shapes. That is why no mechanical method of blocking and measuring is ever completely satisfactory. Such a method is only a student makeshift, useful until eyes are trained to work with hands; but not necessary, even definitely hampering, if its use is continued too long.

Freehand blocking in, however, is always useful, because the mind and eye make the proper psychological compensations almost automatically. In freehand work it should become second nature always to draw a line or a form in relation to the surrounding lines and forms on the paper. If there are none, the line or form must be related to the outlines of the sheet of paper itself.

The outline shape of the sheet of paper, or the canvas, or the wall upon which the artist works, is referred to as the format. The existing lines of the format are of first importance in determining the effects of the lines which the artist places within it.



Exercise (b).

Fig 1

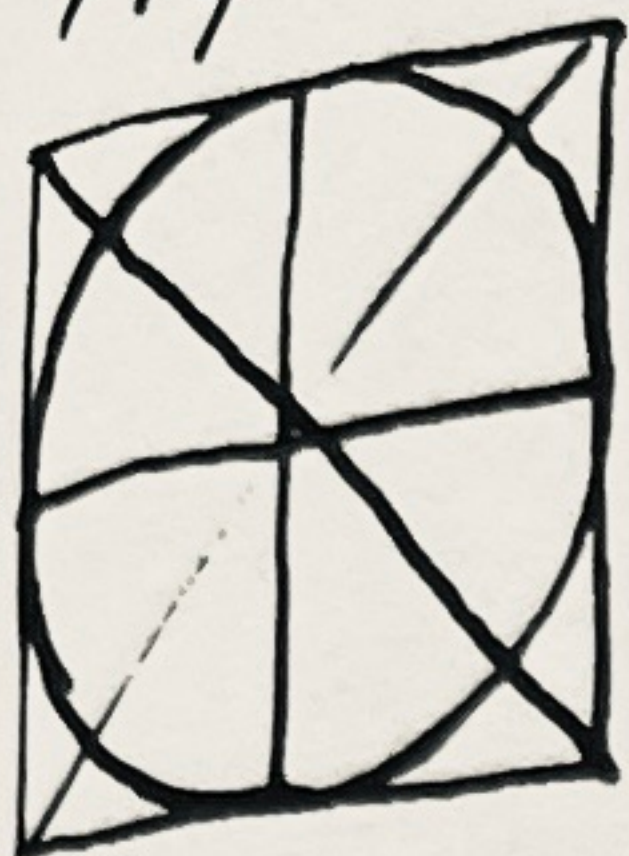
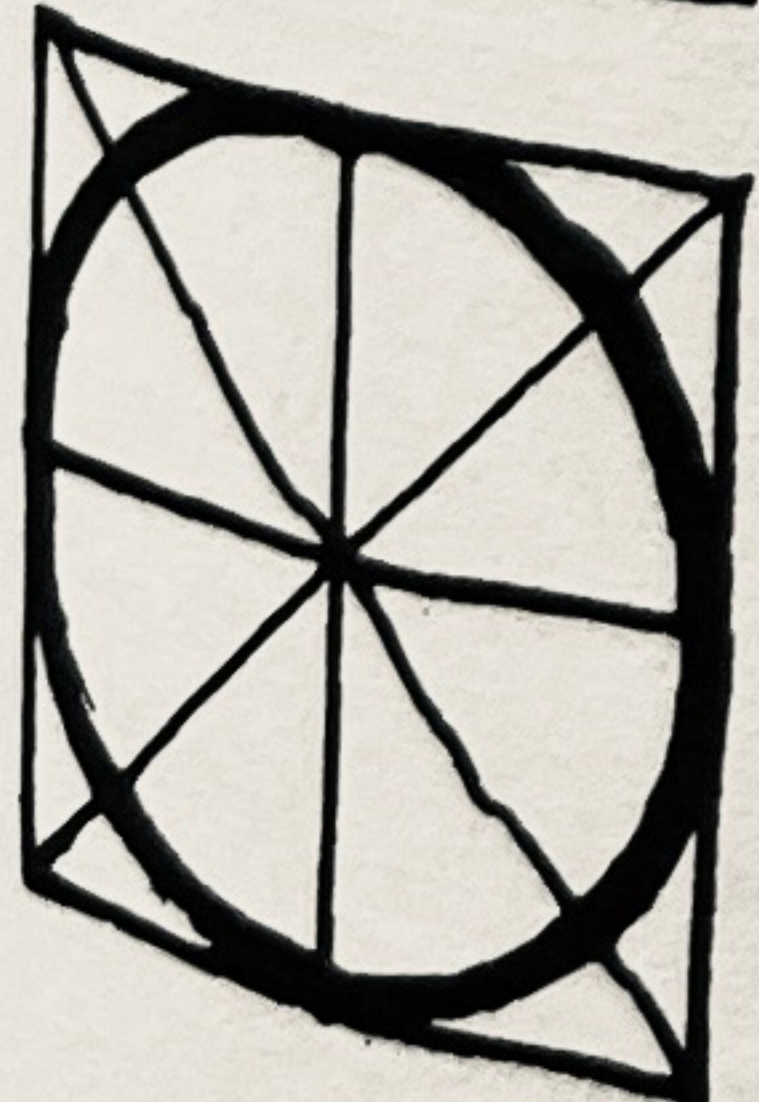
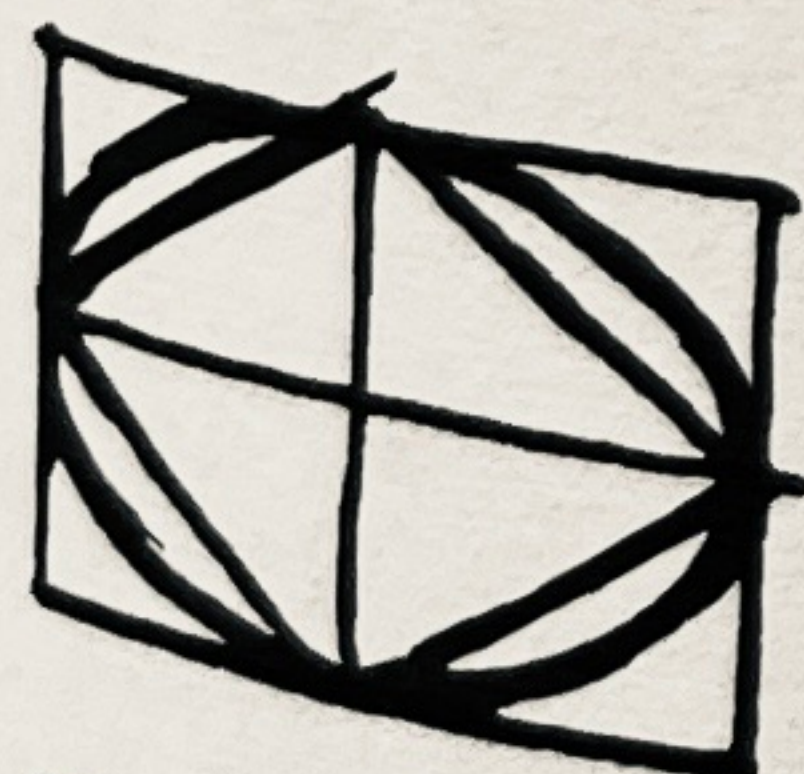
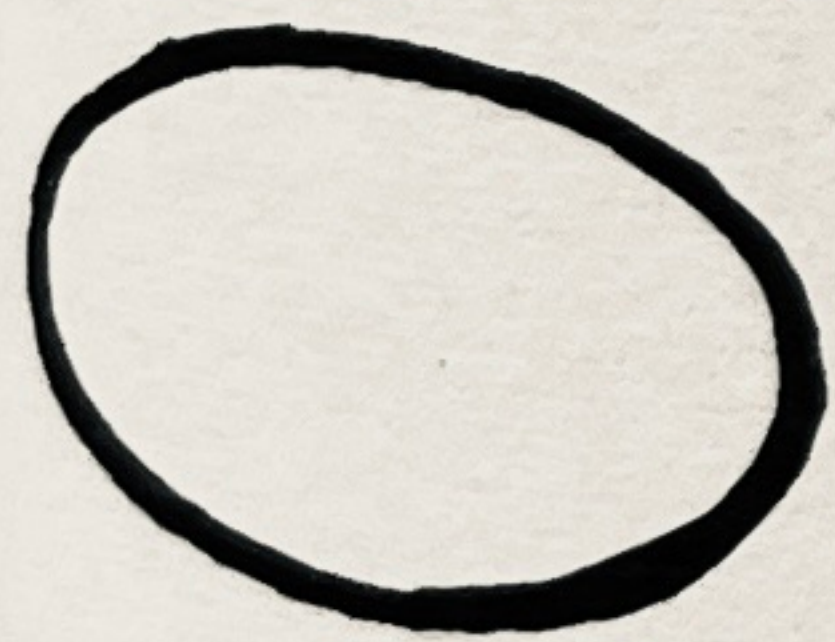
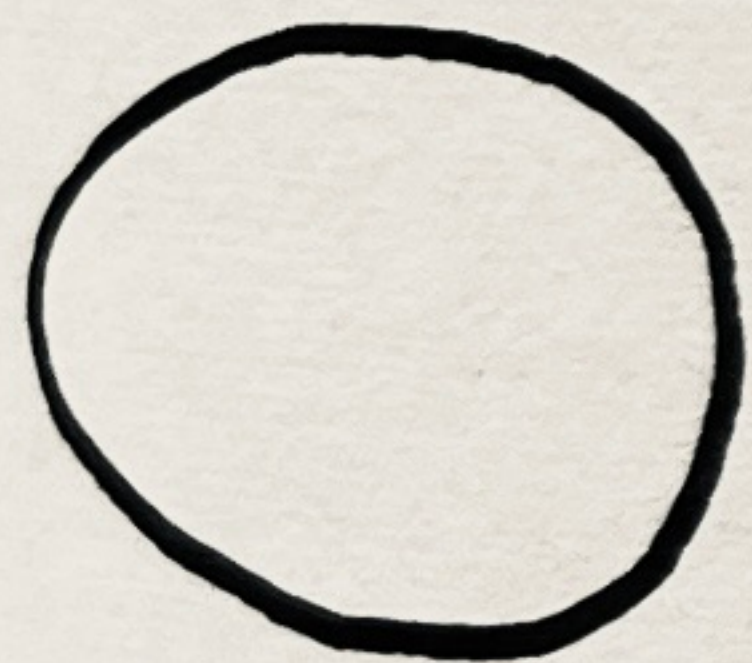


Fig 2



We have now blocked in and drawn our milk bottle in flat pattern. Let us begin to chart the course of its curves in space.

Place the milk bottle in central space so that its top is below your eye. Looked at in this position the top, although really a circle, appears as some other sort of curve. The bottom is like it, but larger. How shall we block these in?

Study the square with diagonals (Fig. 1). Practice drawing it in tipped and turned positions.

Now draw your entire milk bottle block again, but this time draw a top on it. This will be a square seen in center space below eye level.

If you have difficulty here, stand your shoe box on end in this position and study it. The box probably does not have a square end, but will look like Fig. 2. Your milk bottle, however, is as deep as it is wide, and its block should show this fact.

Make a transparent block of your milk bottle block, provide it with sides and a bottom which is parallel with the top you have drawn.

Draw the diagonals of the top and bottom of the block. The points where the diagonals intersect are the centers of the top and bottom circles. But the circle of the top is only half as wide as the circle of the bottom, so divide the lines of your block top into quarters--judging by your eye, of course--and draw lines parallel with the front and back, and parallel with the sides, to connect these quarter marks. This will divide the top into sixteen small squares. Of course these squares are seen turned away from you, that is, foreshortened, but they will stand for and should convey the idea of true squares seen from this position.

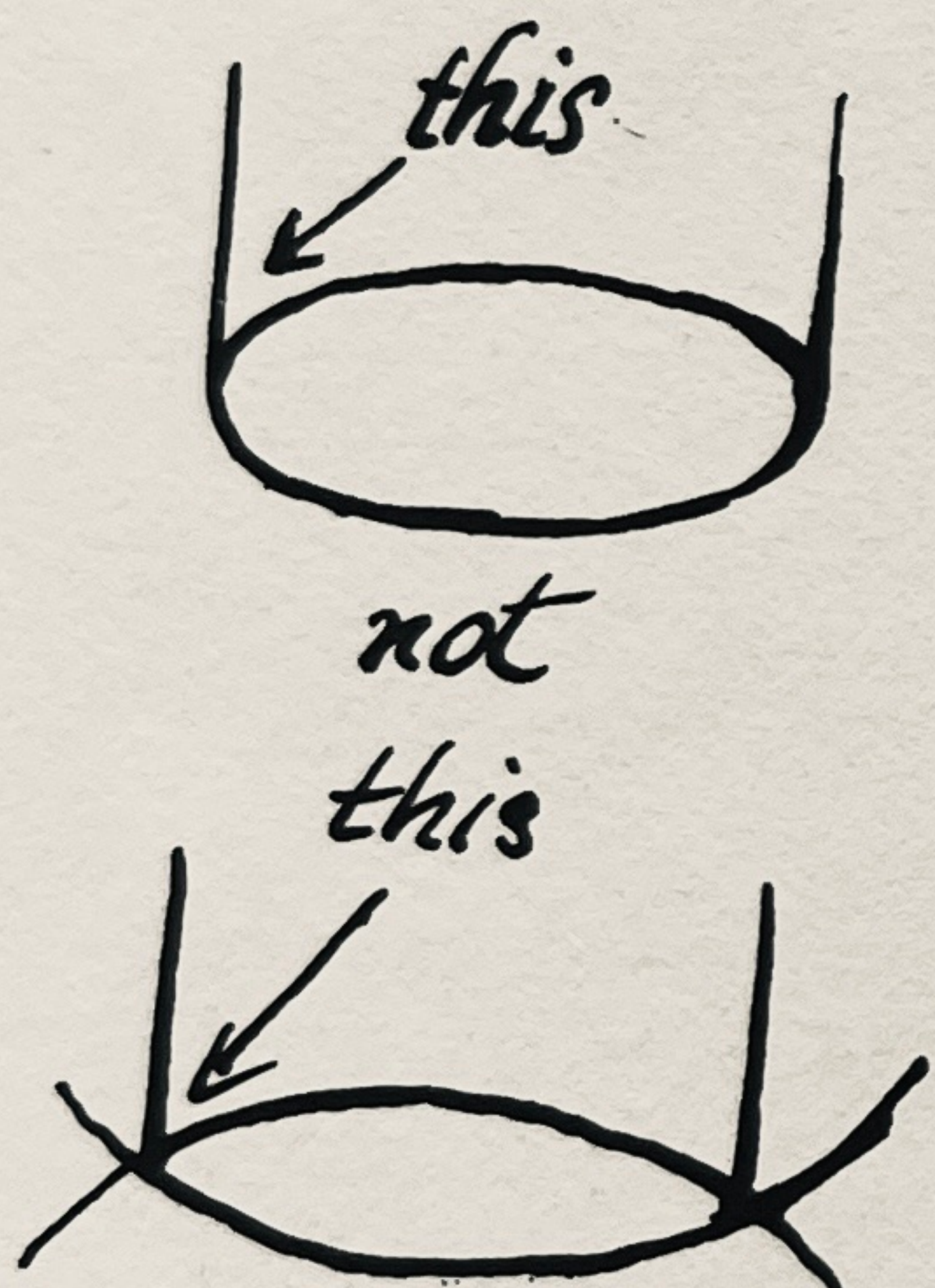
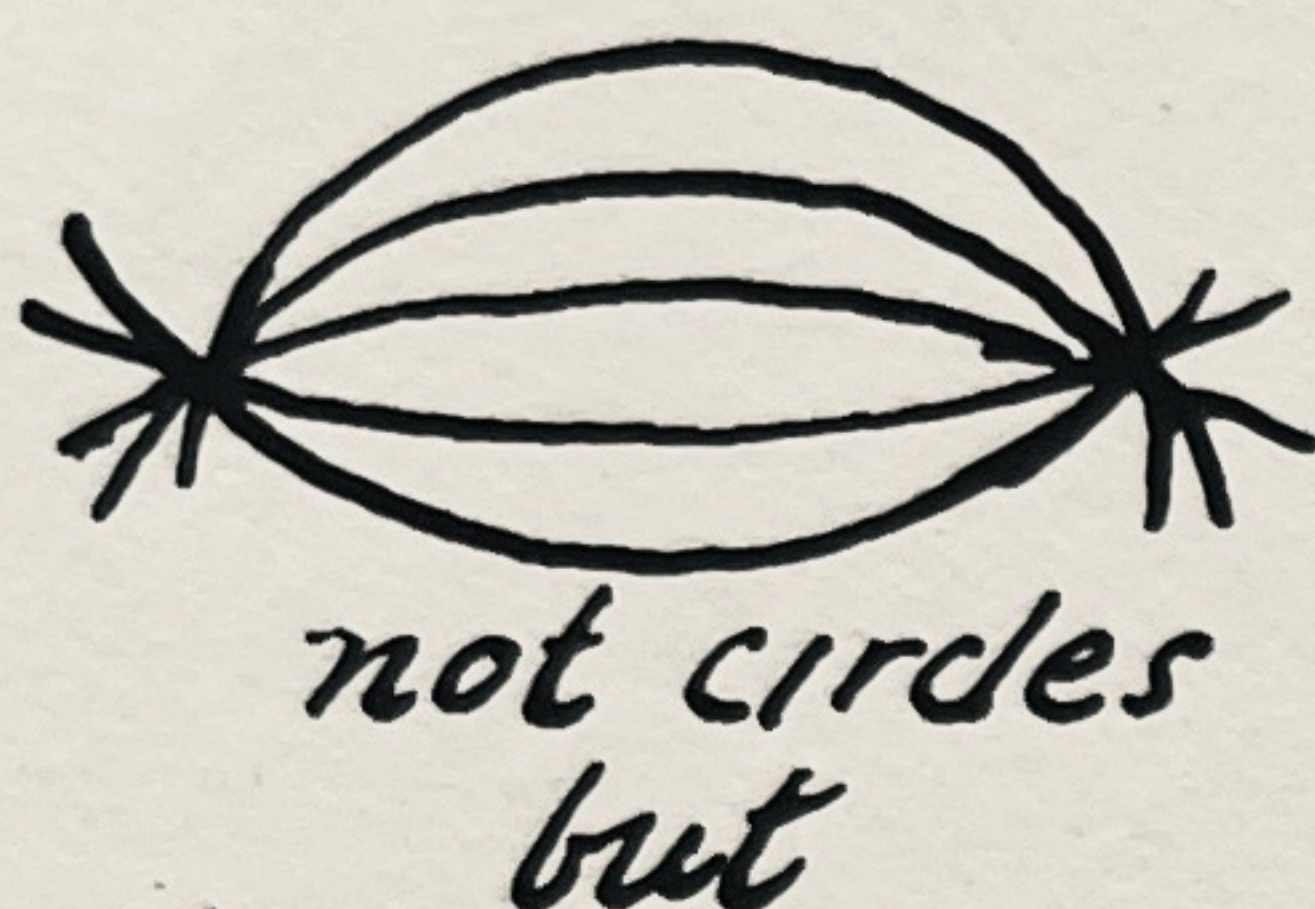
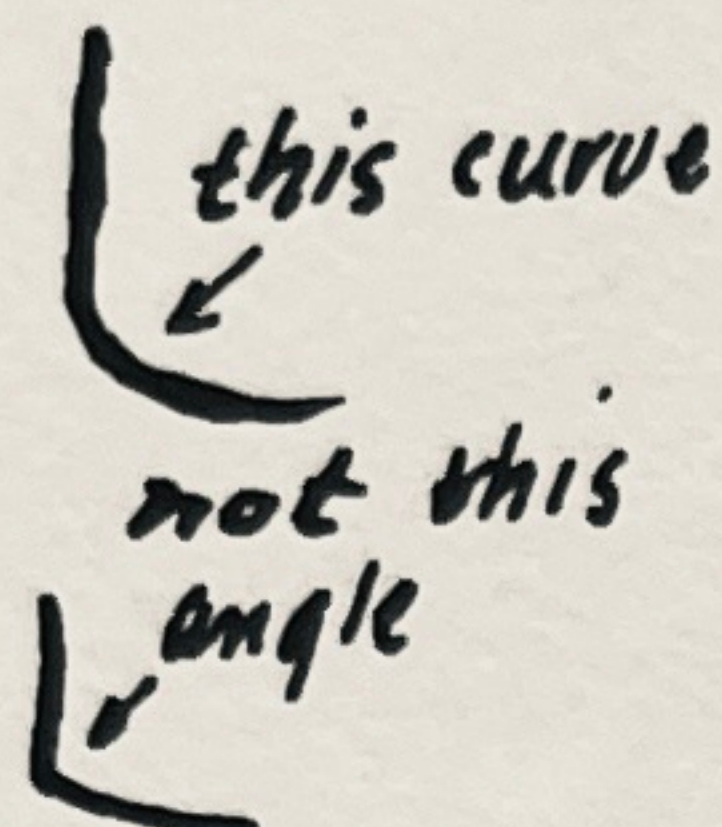
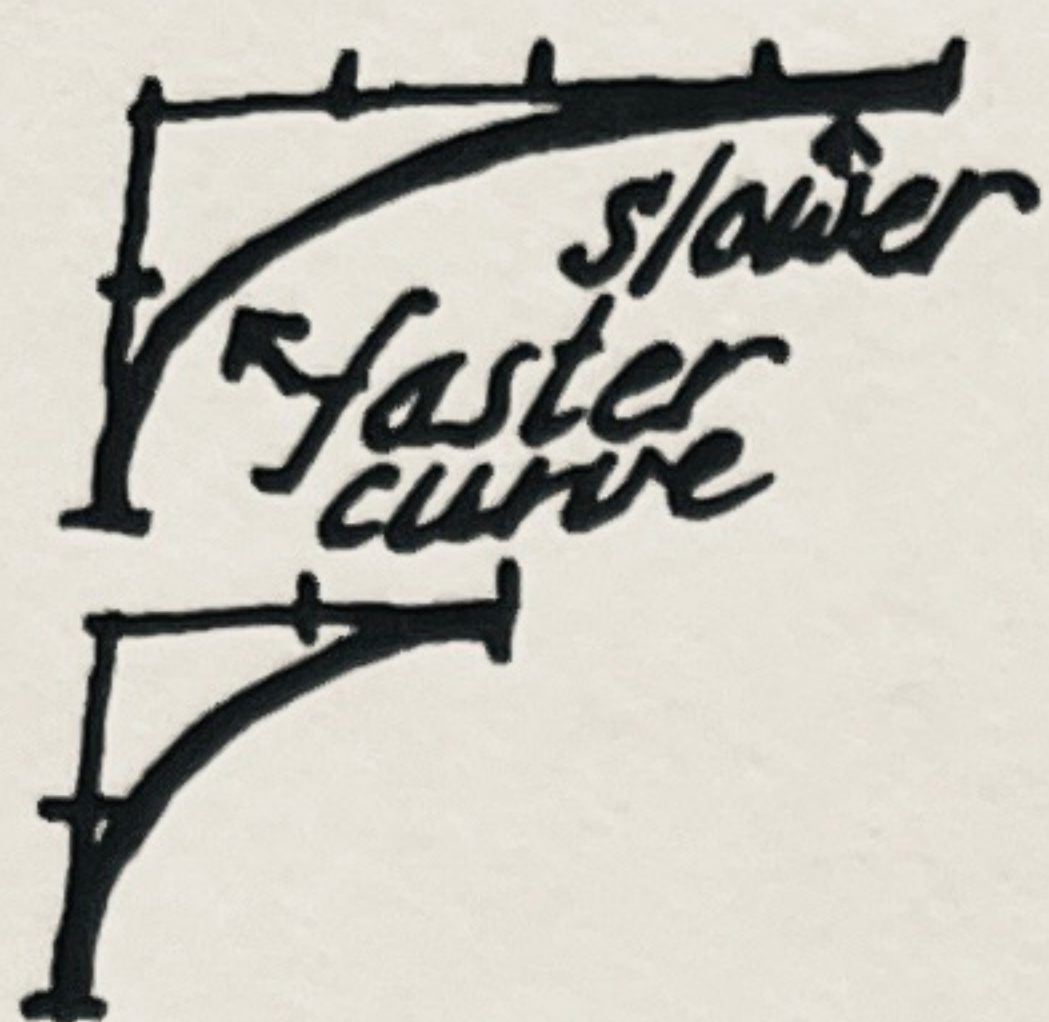
Look at the curve of the top of the milk bottle. Begin to trace it on the top of your block, starting one quarter of the way in on either of the lines which mark the horizontal and vertical axes of the top. The finished curve will look something like an egg with both ends the same shape.

This kind of curve is an ellipse. It may be constructed mathematically, but it is better for us to become acquainted with it freehand. Let us look at the differences between a circular curve and an elliptical one. The curve of a circle, beginning at the horizontal, changes its direction at a constant rate until it parallels the vertical; but an ellipse turns faster and faster as it approaches the vertical. Notice that an ellipse is not made up of parts of circles placed together.

Your drawing of the bottom of the bottle will be an ellipse, too, but this one will fill the full square of the bottom of the block.

Check up on the four quarters of your ellipses. See that they look alike. In future, in drawing freehand ellipses, we may want to vary these parts in relation to each other, so that it is a good idea to know how to draw them exactly alike. We want to be able to notice differences when they come up, rather than to mistake them for accident or carelessness.

Finish up your milk bottle much as you did the flat pattern one. This time, however, the line of the sides will begin halfway back on the bottom square, at the place where the ellipse curves most and changes direction. Notice that for an infinitely small distance the



ellipse goes in the same direction as the vertical line of the side of the bottle. There is a curve, not an angle, where the ellipse joins the side.

Exercise (c).

Go back to the diagram of boxes which you completed for Assignment 4. We want to draw our milk bottle in all these positions in space, in order to find out how its curves act in these various positions.

As before, in order to save time, we shall describe the drawing of the bottle in left hand space below the eye, leaving you to transfer this knowledge to the drawings showing it in the other kinds of space, relative to the observer.

Begin by setting your milk bottle in left hand space below eye level. The characteristics of the curves which we want to study will be exaggerated if the bottle is placed very far to the left. It had better be so located that you may face your pad, and while holding your head in this position glance over at the bottle by moving just your eyes, not your head. This might be about three or four feet in front of you and perhaps two feet to left of your center of vision.

Provide yourself with a tin can. On the round top of this can draw a line with your pencil which divides the circle of the top into two halves: the diameter. Hold the can before you so that this line points toward and away from your body. Mark the near end with an F for front, and the far end of the line with a B for back. When you hold the can in central space below the eye, F is seen directly below B.

Draw a line at right angles to the first one on the top of the can. Label this line H for horizontal.

Hold the can before you at arm's length in the central position and move it slowly to the left, keeping the H line parallel with your face and the horizontal of your pad. You must turn the can in your hand a little in a clockwise direction as you move it, in order to maintain this horizontal relation. Move it about a foot from the center of vision in this manner, held at arm's length and below the eyes.

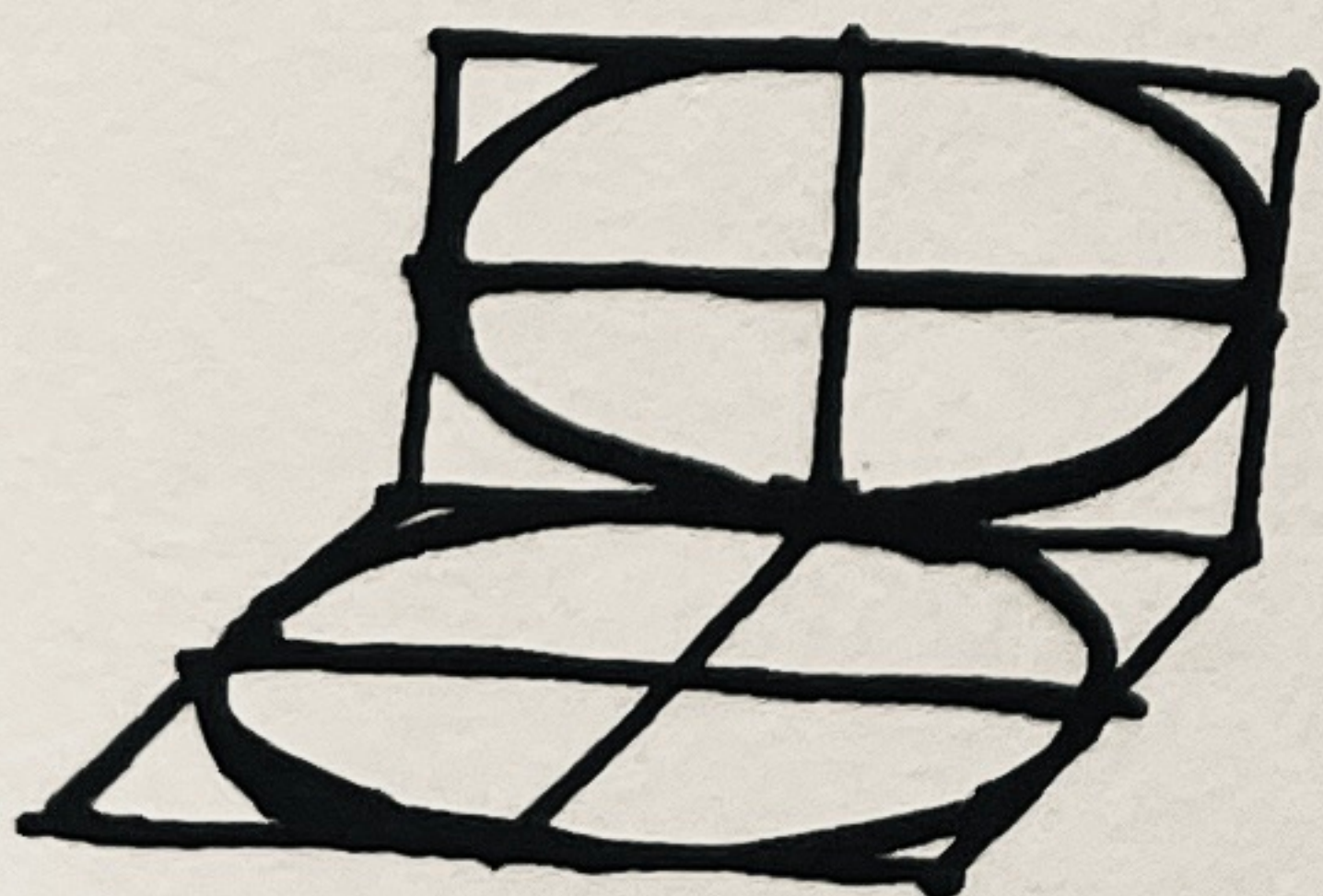
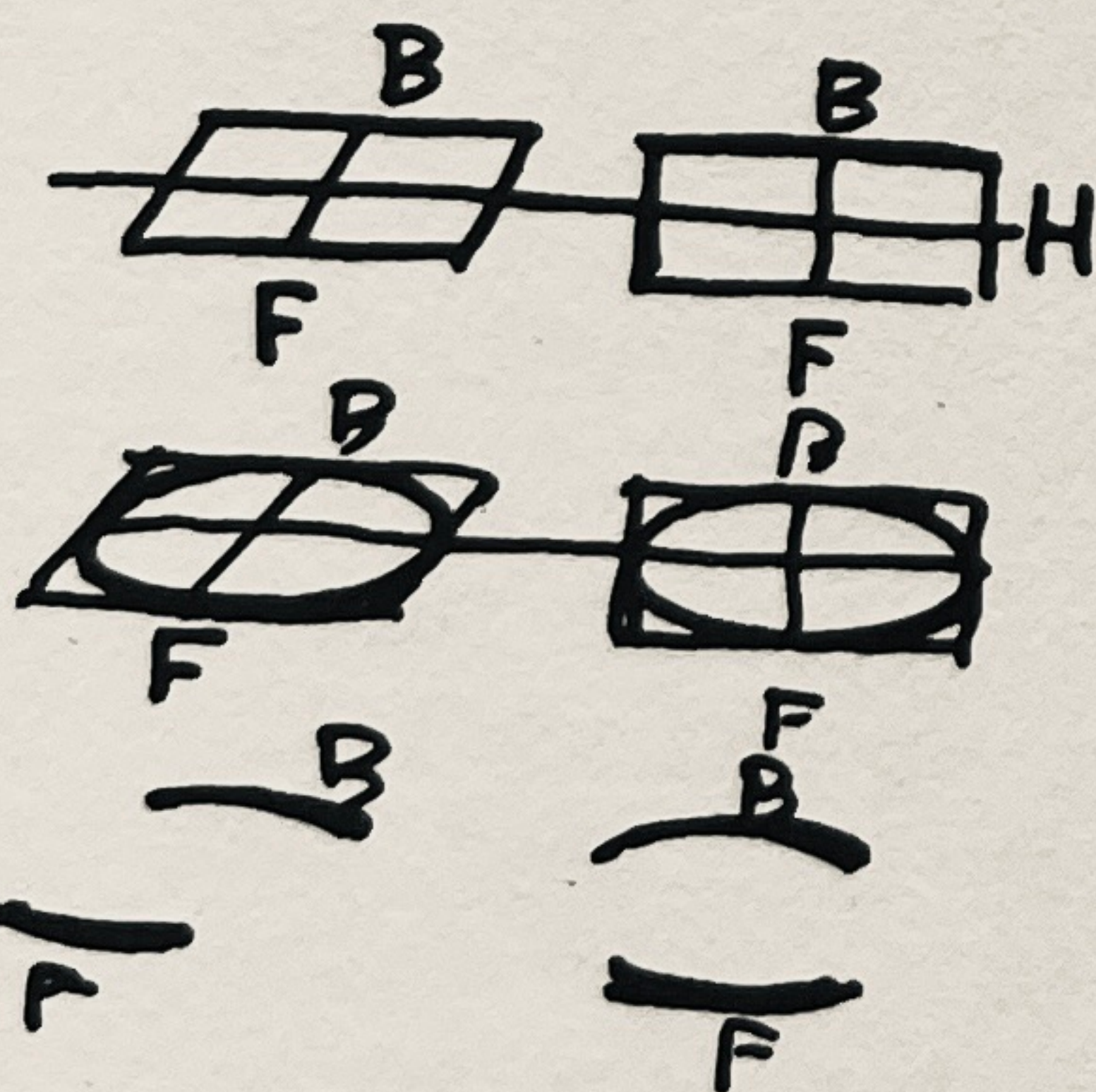
Now notice something: what we marked as F has now moved on the field of vision in its relation to the part marked B. It has moved to the left, while B has moved to right, and the line F to B which was vertical in central position is now a diagonal, running from lower left to upper right.

This front-back line is the line marking space direction. We have used it in the construction of our boxes in the several positions in space. Consider it carefully, for it is a very important line in blocking out this and other objects.

Leave your milk bottle where it is for the present, over there in lower left hand space. Put down the can, and draw a square parallel with you, below eye level, and to left of the center of vision: in left hand space. Draw in the axes, F to B and H. The horizontal will of course agree with the horizontal of your paper, and FB will be a diagonal.

We have constructed a square in a foreshortened position, seen to left and below us. Now try to draw an ellipse into this square as you did in Exercise (b). First draw in its major and minor axes.

Do the axes of the ellipse--Exercise (b)--coincide with those of this foreshortened square? The horizontal axis of the ellipse should agree, but not the vertical axis, for the FB line is now a diagonal.



A foreshortened circle may be represented by an ellipse in central space, but this curve is no longer an ellipse when it moves into left hand space. What kind of curve must it become to fit into this block determined by FB and H in the new position?

It must become a curve the lowest part of which touches F and the highest part B. This will make a shape which is no longer a true ellipse.

Look at your milk bottle carefully, with due regard for keeping your face parallel with your paper, and you will see that its top and bottom have become curves of this nature.

Observe another change in its appearance which is in harmony with the change in the curve: one shoulder of the bottle now seems higher than the other.

How has this happened? In central position you saw the outline of the bottle with sides equidistant from you. The two shoulders were equally high, and the bottle was bi-symmetrical. Now, however, you see not only the front of your bottle, but the nearer side also. This near side is a rotated plane, moving back in space.

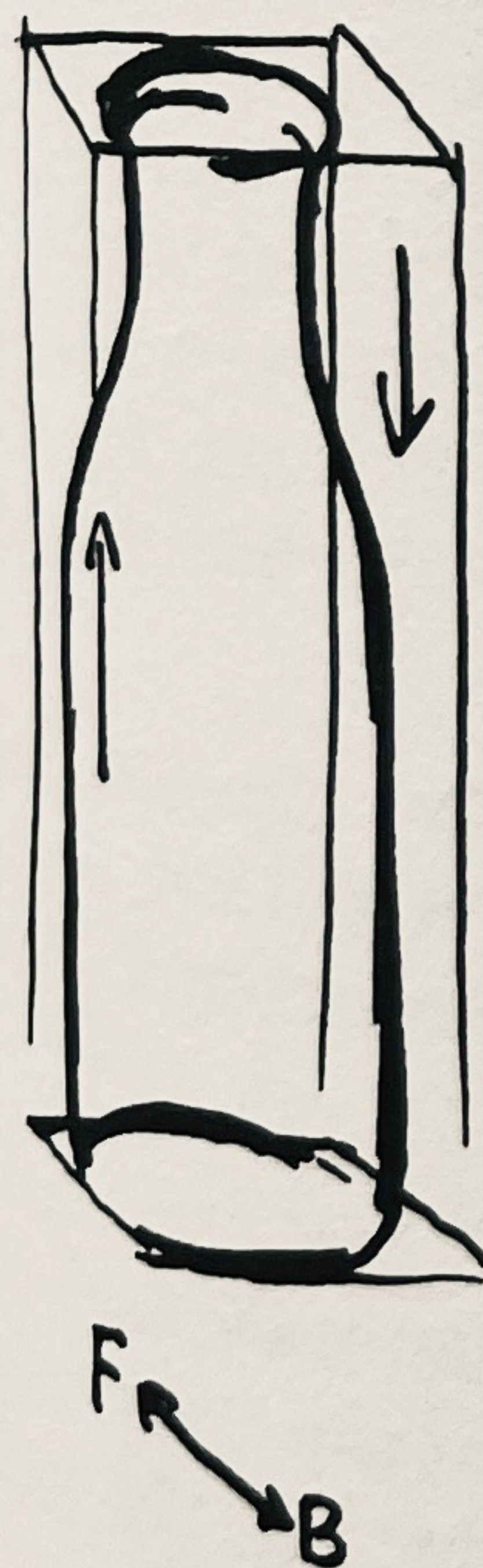
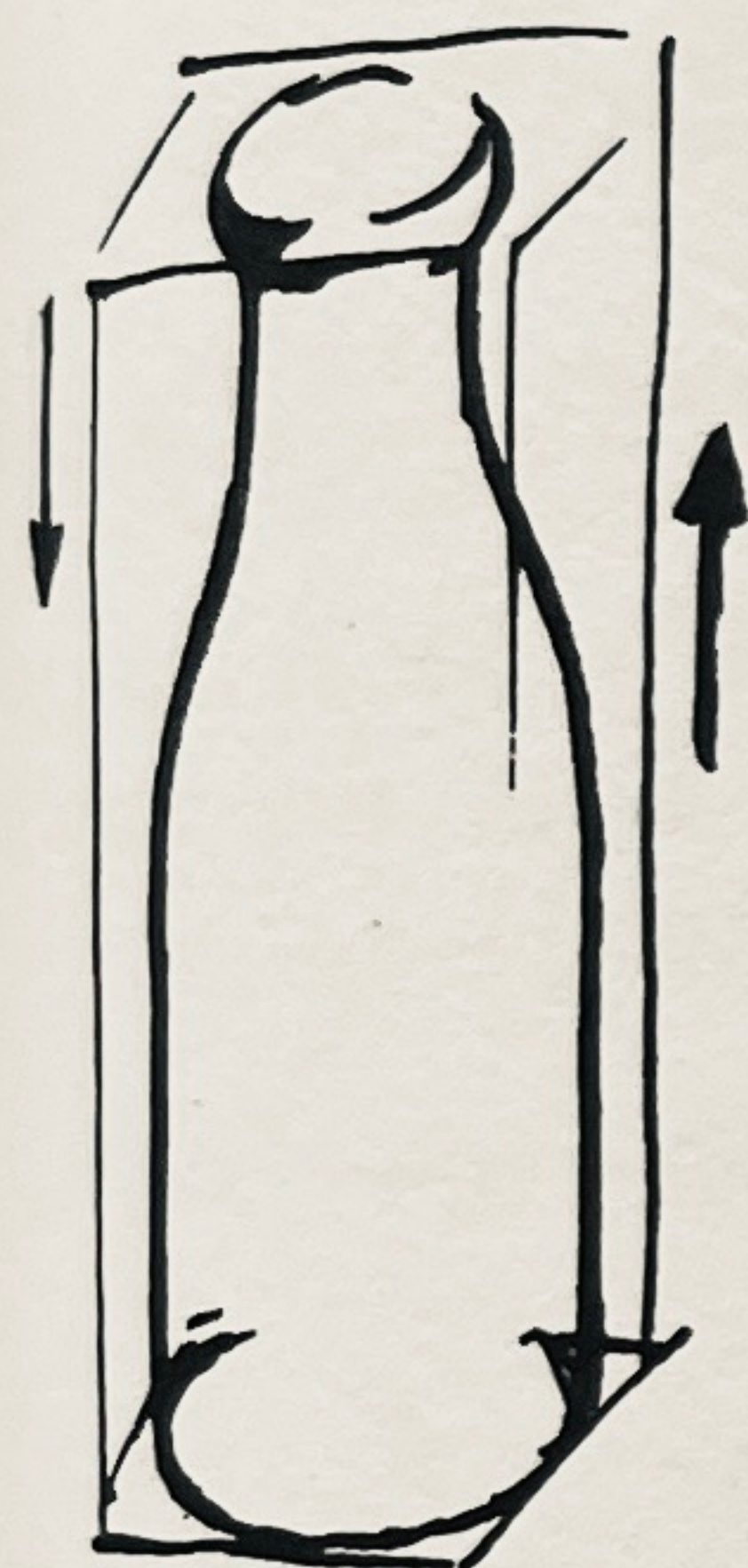
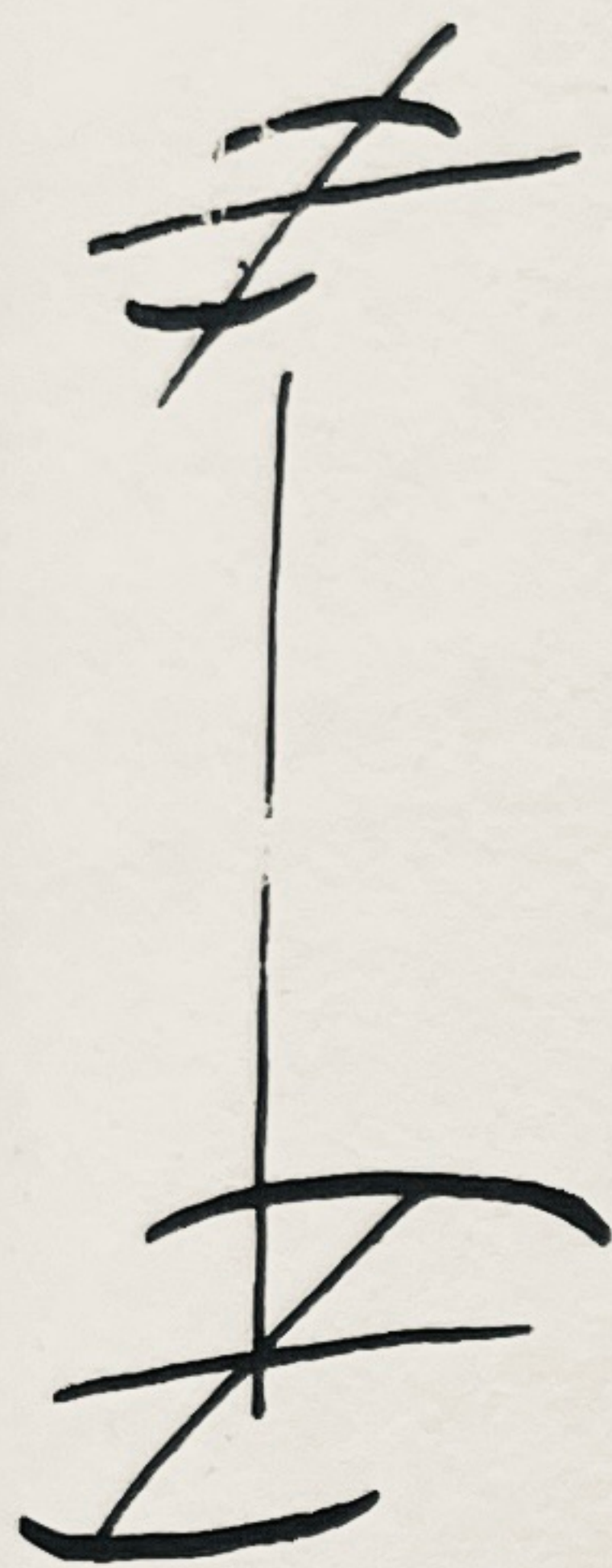
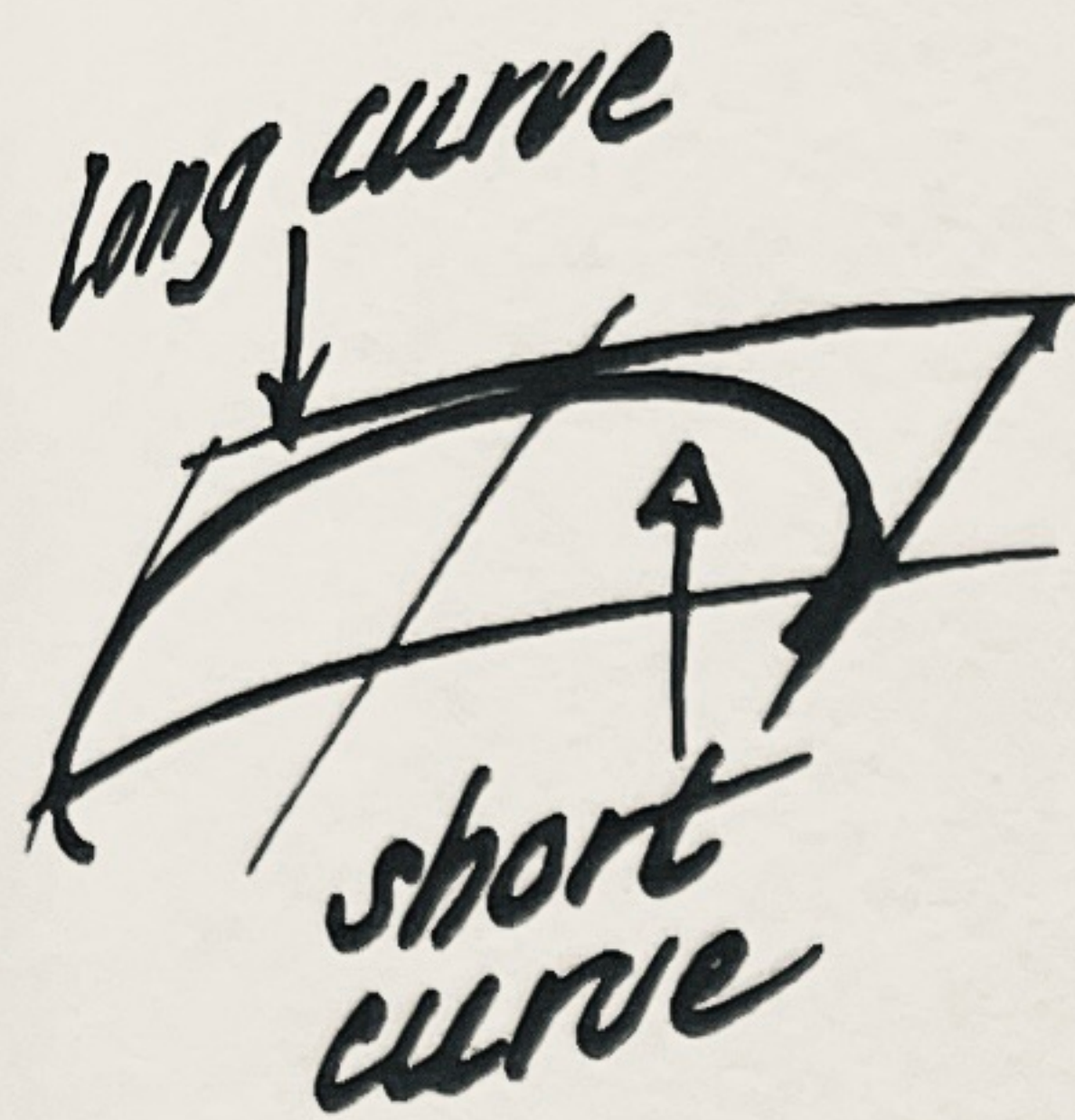
It will help you at this point to get your shoe box and place it beside the bottle, with its front line parallel with the line of your paper and the line through your eyes. This will resemble the milk bottle block which you are about to draw.

We marked the beginning and end of the curve at the side of the milk bottle when we drew it in flat pattern, Exercise (a). In the present position this curve begins higher on the right side of the bottle than it does on the left side. You are unable to see so far around the bottle on the left as on the right.

We have found that in space below the eye, up means back and down means forward. This principle has been applied to the ellipses; now apply it to the curves at the sides of the bottle. The right side and shoulder of the bottle is higher than the left, when drawn in lower left hand space. When it is in lower right hand space the opposite will be true.

Complete your drawings of the bottle by showing it in each of the four kinds of space which exist relative to the observer. Remember that space direction is reversed in space above eye level, so that the positions of the curves on the sides of the bottle, and on the front and back of the ellipses must change accordingly. The following drawings should be included in this exercise:

- (1) The milk bottle in lower left hand space.
- (2) The milk bottle in lower right hand space.
- (3) The milk bottle in upper left hand space.
- (4) The milk bottle in upper right hand space.



Exercise (d).

Take your box, draw circles on its top and sides, and look at them in various positions.

Draw the round tin can in several different positions. Try them quite near eye level, near the center line, then further below, and higher above. Try in both left hand and right hand space. Include six drawings of the can in different positions, in your assignment.

On the basis of this experience with ellipses, we find that curves may point direction just as do straight lines. Curves whose axes agree with those of the paper surface, or format, (always considered as vertical and horizontal), will apparently lie on that surface. Curves built around axes which turn away from the vertical or horizontal, will seem to protrude forward or push back in effect, from the two-dimensionality of the format. They will present to the mind the idea of curves moving in three dimensions.

Exercise (e).

You pinned your leaf to the shoe box and drew it turning and tipping. Now try drawing other flat and more complicated curved shapes so that they agree with the axes of tipped and turned planes.

Make a drawing of a plate, knife, fork, spoon, and napkin when set for a place at the table, seen in left hand space.

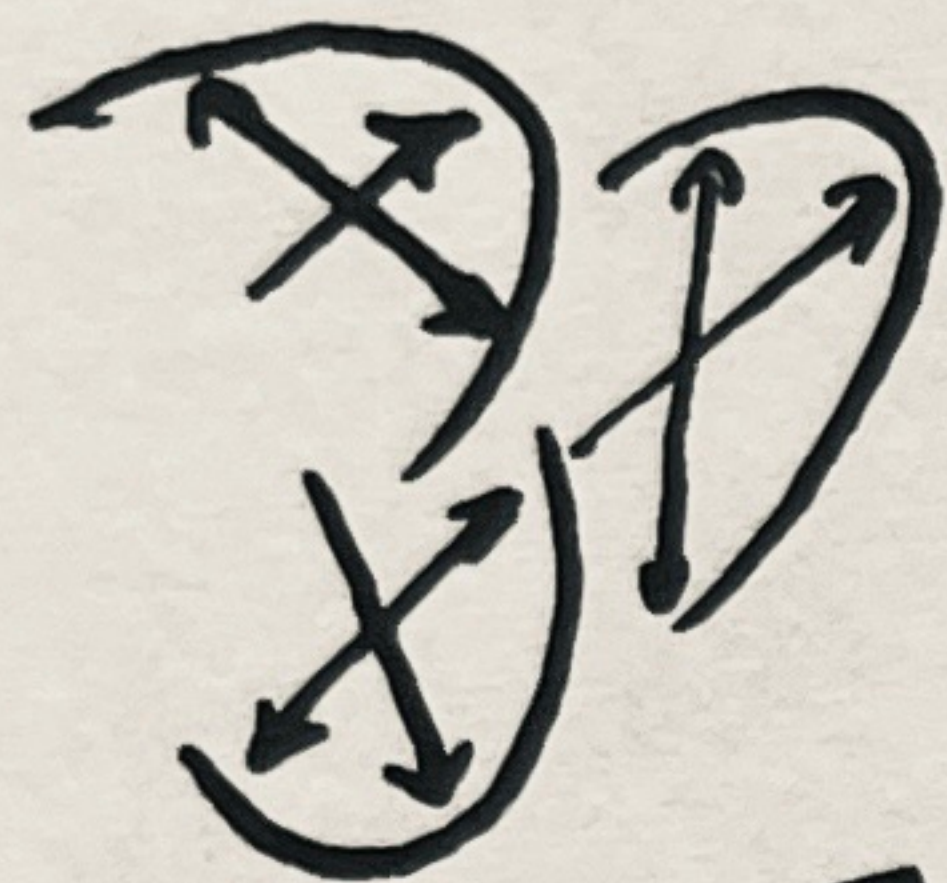
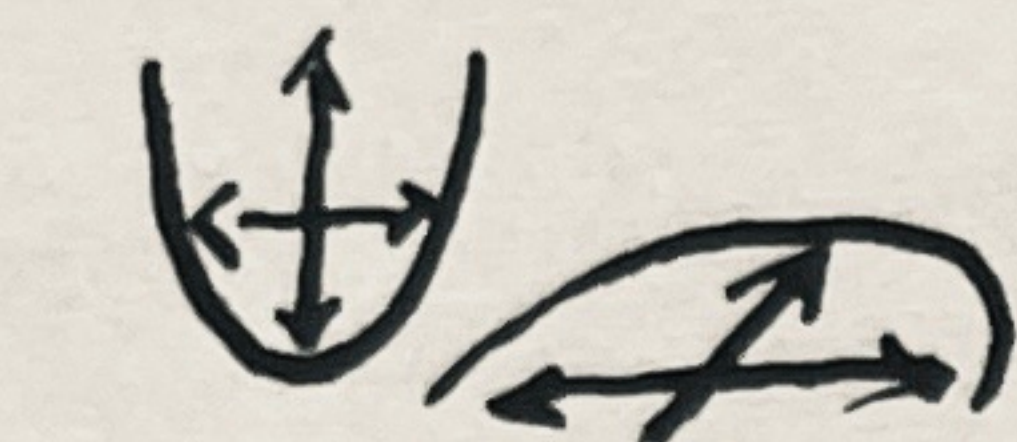
Make another drawing of the same subject, seen in right hand space.

If you have trouble in drawing the fork and spoon, try blocking out the main directions of their movement with planes. Then draw the curves to lie on those planes and you will not find it too difficult to get them right.

These things which you have just learned about curves are not to be found in most art books, for they were not really understood until comparatively recently. However, the evidence is plentiful in the works of Rembrandt and other accepted masters that they knew these things and used them in their paintings, although they didn't write books about them. An excellent example of a bowl seen in left hand space below eye level occurs in the famous etching by Rembrandt called "Abraham Sacrificing Isaac." This work has been reproduced in many books and magazines and you will probably find it in your public library.

The mechanical draftsman, for the sake of simplicity, ignores the variations of ellipses in left and right hand space. The method of mechanical drawing includes a convention by which all foreshortened circles are considered and drawn as ellipses.

But the painter who wishes to develop the rhythm of his compositions fully, finds necessary a greater sensitivity in the treatment of curved lines. Some artists follow one style, others another, but these basic principles may not be entirely ignored without reducing the quality of the art work produced to a dull, mechanical formula.



Part I · Assignment 8

Further Exercises in Blocking-in; Gradations

In Assignment 7 you discovered how to use skeleton lines and block forms as guides in building up more complex structures. You have found out the importance of determining such things as central axes. (The central axis of the milk bottle was an imaginary line from the center of the top to the center of the bottom.)

Let us find the central axes of some other useful shapes, and learn to evolve these shapes from simple block forms.

Exercise (a).

Draw a triangle with sides of equal length (an equilateral triangle). Let one side be parallel with the horizontal of your paper.

Draw another triangle with base the same length but longer sides, equal in length to each other (an isosceles triangle).

Draw in the central vertical axes of these two triangles.

Draw a triangle of about the same width, whose sides are all unequal. (This is called a scalene triangle.) In the isosceles and equilateral triangles the central axis was vertical, but in the scalene triangle the upper point is not directly over the center of the base line. Its axis, drawn from the upper tip to the center of the base, will not be vertical, and the figure will give the effect of being tipped.

Draw a scalene triangle whose major axis is vertical with your format.

Exercise (b).

A pyramid may be many-sided, depending upon the shape of its base. We shall work first with a four-sided pyramid. All its sides are identical triangles. Its tip or apex is located where the upper points of these triangles meet.

Draw a square foreshortened in lower left hand space.* By drawing the diagonals, find the central point of the square. Judging with your eyes alone, find the point directly above this center which will serve as the apex of a four-sided pyramid composed of equilateral triangles. Finish this drawing of a four-sided pyramid in lower left hand space. (1).

Draw the pyramid (2) tipped, (3) rotated, and (4) standing on one of its corners, being careful to keep the central axis always perpendicular in effect with the base plane. In other words, as you move this pyramid around you must not push it out of shape.

Exercise (c).

Draw a triangle foreshortened in left hand space. Find the center of this triangle by drawing a line from each corner to the center of the opposite side. (All of these measurements should be taken by eye alone.) The point of intersection of the lines is the center of the triangle:

Erect a vertical from this center and join it to the corners to make a triangular equilateral pyramid. (1).

Draw this form (2) tipped, (3) rotated, and (4) both tipped and rotated.

Draw another triangular pyramid with a central axis which is not vertical. (5).

*Refer to footnote on page 43.

Draw this form (6) tipped, (7) rotated, and (8) standing on one of its corners.

Exercise (d).

Draw a square foreshortened in lower left hand space. Cut off its corners to get a figure which will stand for an equilateral eight-sided figure in foreshortening. Find the center by means of the diagonals. Erect a vertical and complete the figure: an eight-sided pyramid.

Now slice it horizontally through a point halfway up its vertical axis, as follows: erase the lines which form the tip above the halfway point, and connect the lines of the sides to form another octagon similar to the base and parallel with it, but smaller. Each of the triangles which formed the sides is now truncated, and this is a truncated pyramid.

Exercise (e).

Draw a triangle in foreshortened position in lower left hand space. Cut off its corners to form a foreshortened equilateral six-sided figure in effect. Erect a vertical on a point which is not in the center of the base. Draw in the triangular sides.

(1) Truncate this figure at a point about one-third the distance from base to tip. Now turn it, tip it, and stand it on its corner, in drawings (2), (3), and (4).

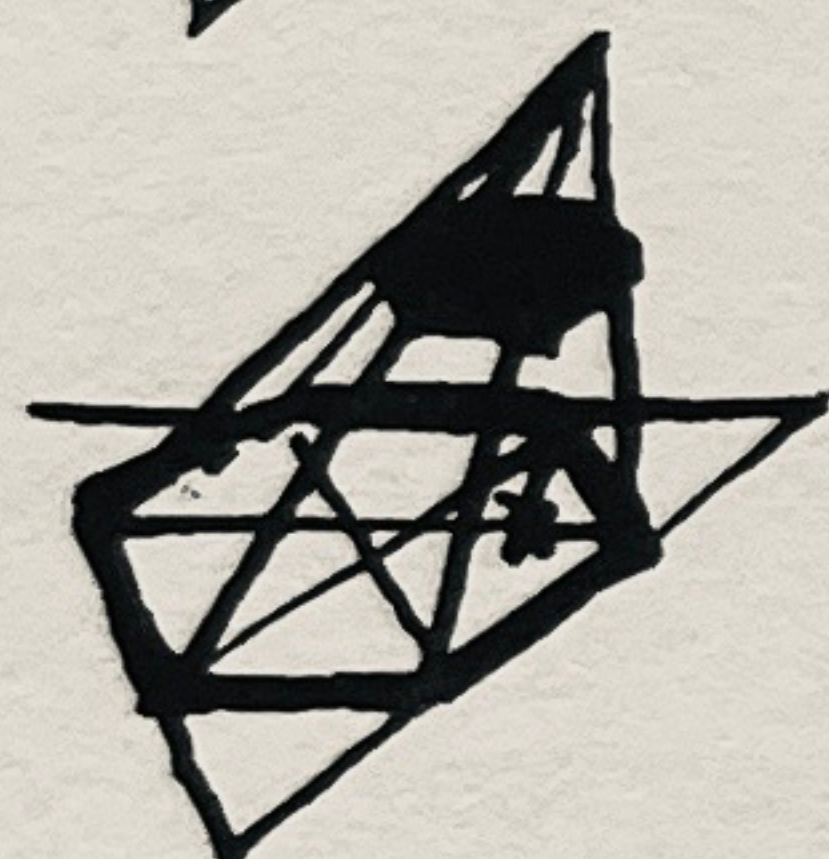
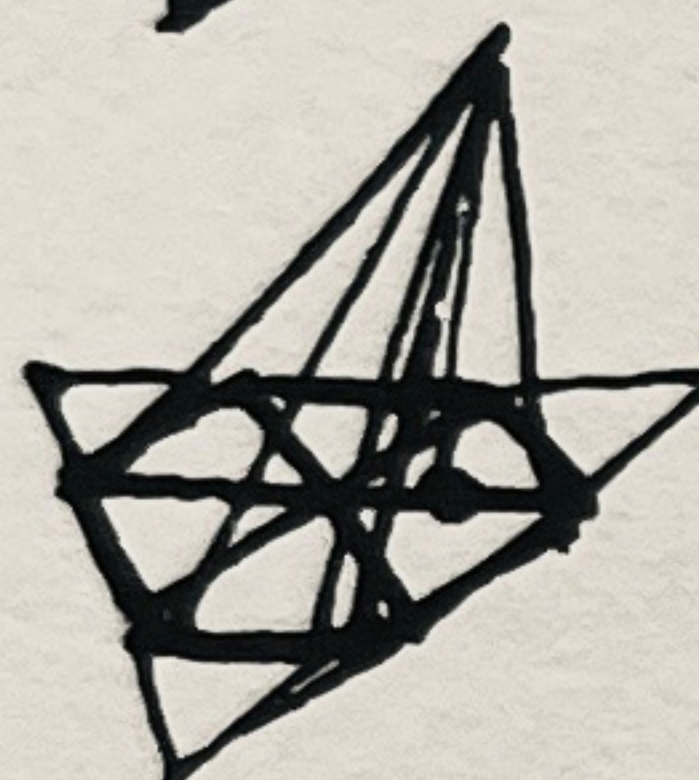
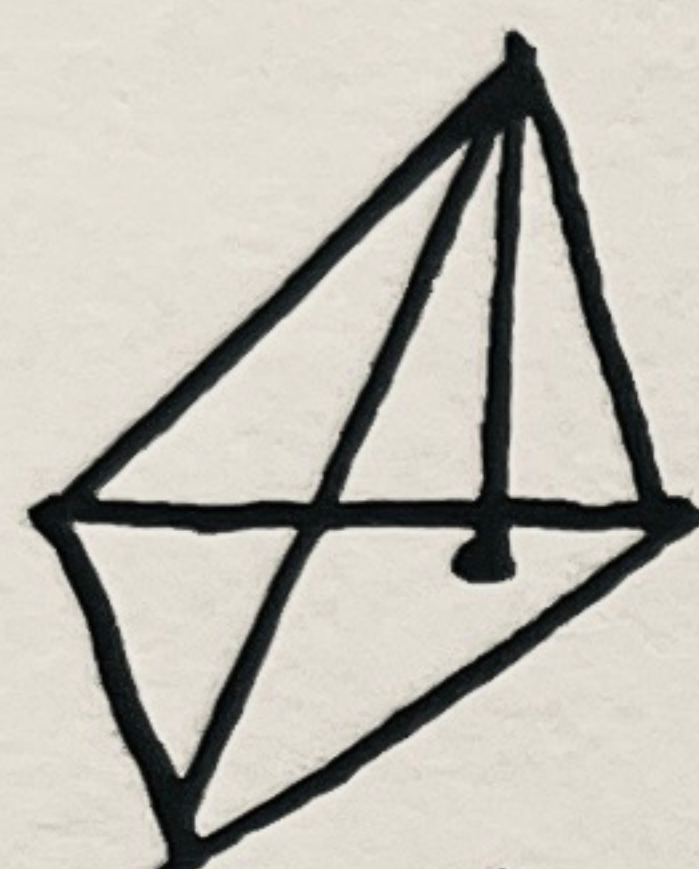
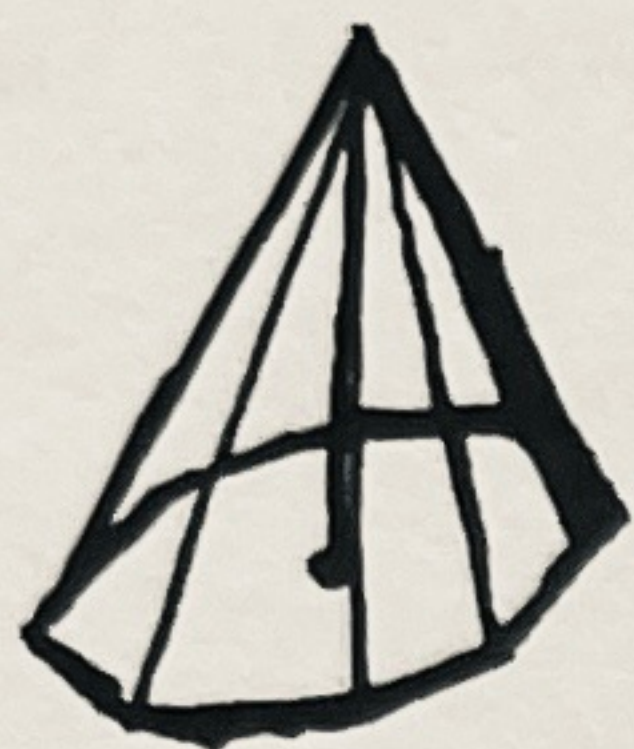
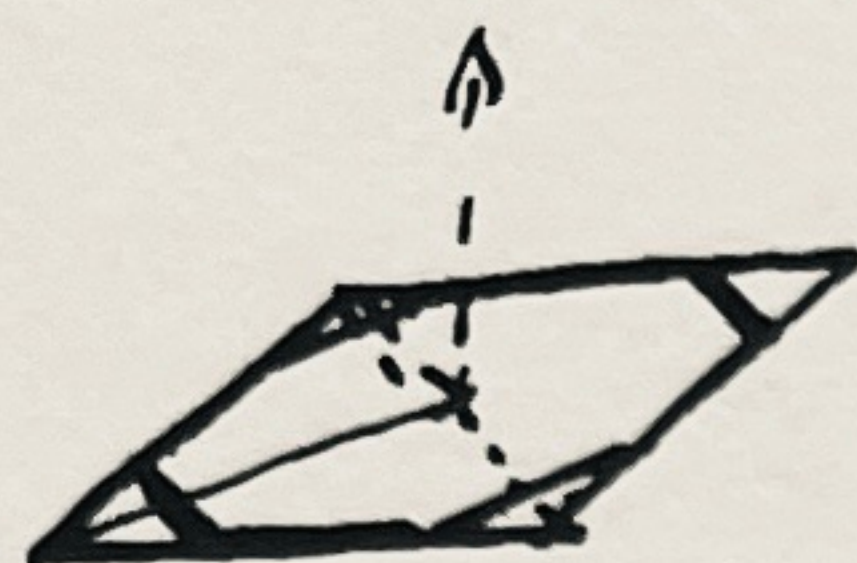
You now have a whole series of geometrical drawings. Doubtless the main figure in each is somewhat obscured by the many construction lines you must have used. When there are too many lines calling equally for attention, none is effective, and the important structural lines must be emphasized in some way. This may be done either by making them heavier according to their importance, or by the use of value contrast.

Go over your drawings with brush and watercolor, using from three to five values to make their planes contrast with each other. Sometimes the use of construction lines will have made a drawn figure look transparent. Leave such lines in, and paint the figure so that it looks like a solid form which is under strong illumination. Light some figures from the left side, some from the right, and some from the front, choosing the illumination which will best bring out their essential planes. Treat all as solid forms.

Values are very useful for simplification and emphasis in drawings which have become too complex for easy understanding because of the use of too many lines. They may often be used to "pull together" a drawing which is apparently meaningless, "falling apart" as a result of the same fault.

Gradation

You learned to make a gradation with watercolor during your work on the cup for Assignment 6. You may begin a gradation by wetting the paper with water and working into it with more and more pigment on your brush, or you may begin with the pigment and use more and more water on your brush as you go along. In either case the creation of a smooth gradation will depend upon a constantly diminishing amount of pigment from dark to light.



Exercise (f).

You have learned to construct an eight-sided pyramid. Using the same structure, indicated in very light pencil lines, draw a cone. A cone is very like your many-sided pyramid, except that it has so many sides that they are indistinguishable. Its base is a circle. In value, it will be expressed not by contrasting planes of pigment, but by a gradation.

Do three cones in watercolor, from imagination, with the light coming from the front, from the left side, and from the right side. Try to keep the gradation changing in value just as constantly and smoothly as the circle at the base changes direction.

Draw three cones in various tipped positions, each illuminated from a different direction as above, but this time render the gradations in line. Begin by marking very lightly the place where the lightest part of the gradation begins. On one cone let your lines run from tip to base. On another let them follow the round contour, parallel with the circle of the base. On the third use a combination of diagonals to form a cross-hatch in the darkest part of the cone, and finish out the lightest part with either one of the diagonals, but not both.

Irregular Gradations

Any surface which is not continuously curved will present irregular effects of gradation. Often a curved shape such as that of an apple seems rather to be made up of flat places which curve into each other at their edges, than of really continuous curves. These flat places are the planes which we use in blocking-in the apple, and they give us the key to the sort of block we should use in planning it.

The short planes which connect these planes may be expressed by quicker changes in gradation. Extent and smooth constant change in a gradation are visual symbols for the length of a curve.

Most natural forms which at first glance seem to be continuous curves are really combinations of curves and flat places. Look at the outline of a hill, or the contours of your hand. You find curves flowing into straight lines and straight lines joining curves.

Straight lines associate themselves in our minds with basic geometrical structure: the block forms. Emphasis on these elements produces hardness and rigidity of form, in effect. Emphasis on curves increases the effect of softness and movement. Both qualities are found in combination in natural objects.

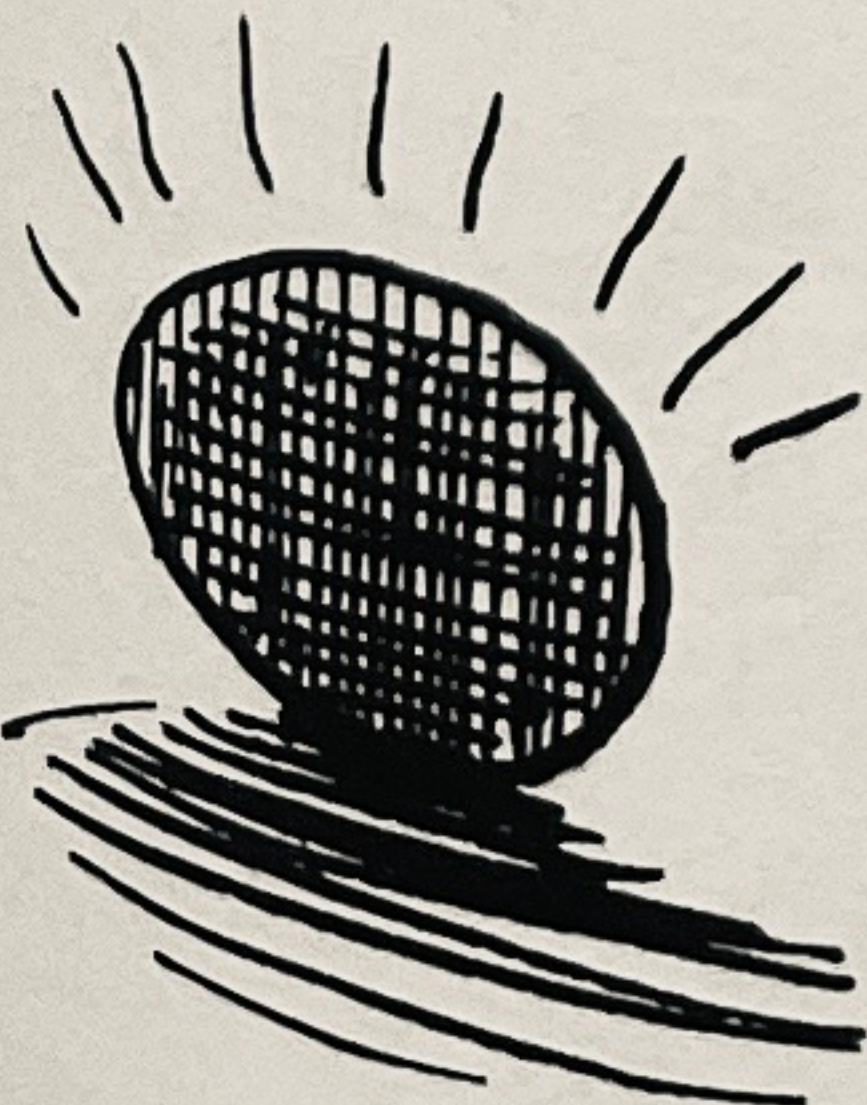
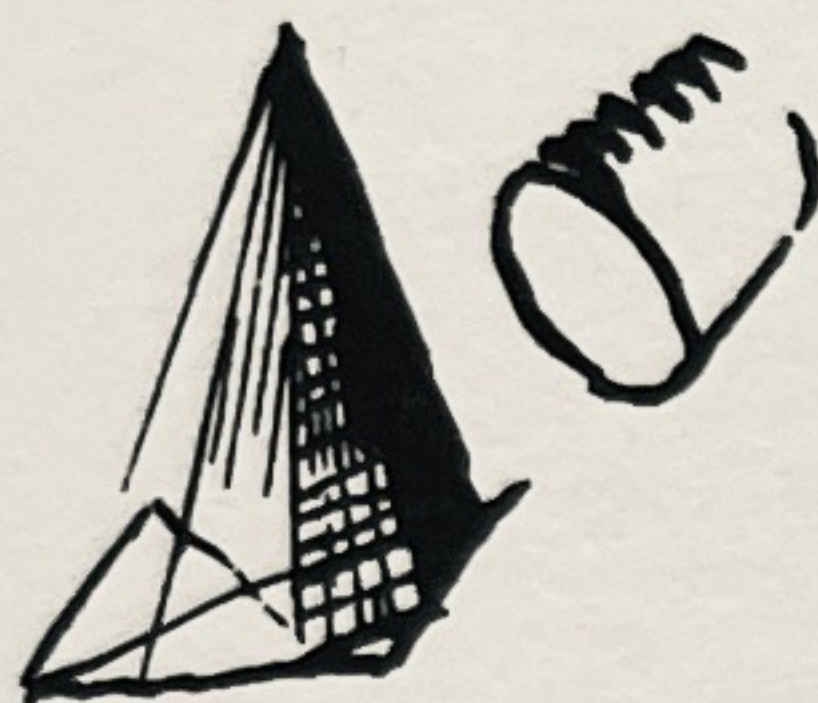
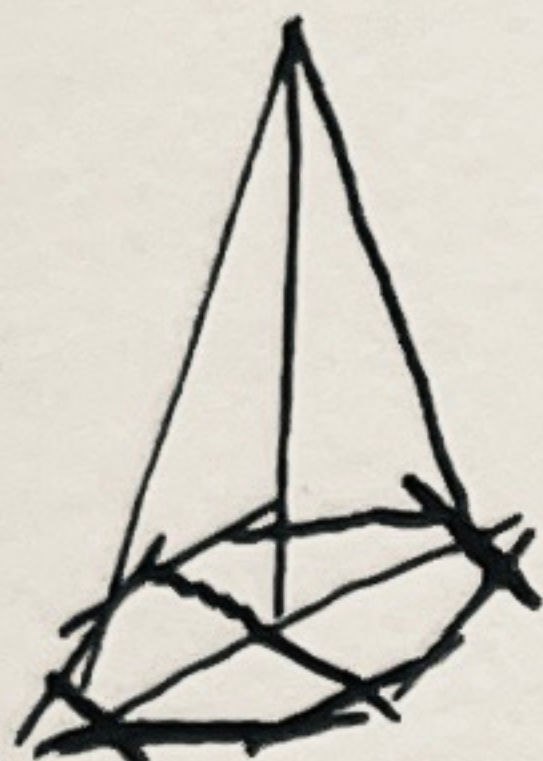
Exercise (g).

Place an egg before you and study its gradations in several kinds of illumination: with light coming from the left and diagonally above, from left and horizontal; from directly behind.

Notice that in this last position the egg fails to give much effect of being a rounded form having three dimensions. Its silhouette is practically all that we can see.

Bring the light directly in front of the egg. You will get just the reverse effect here, of a light-colored egg against a dark background, but the flattening effect is similar.

We may say that side, top or bottom illumination emphasizes the surface contours of an object; front or back illumination emphasizes silhouette at the expense of surface contours. If we place our egg in



diffused light where it is illuminated equally from all sides, it is further flattened in effect.

At the first opportunity look at the effect on the forms of hills, of the long horizontal rays of early morning or late afternoon light. Look toward the sun, then at right angles to the sun, and then away from the sun. You will find that the shadows seen in the right angle position emphasize the contours.

Looking away from the sun you will see few shadows, but more intense color. Looking toward the sun you will notice chiefly silhouettes of the dark shadow sides of forms against the light. In this position the artist's only opportunity to bring out space effects lies in the manipulation of edge contours and their overlapping. This of course is true of any outline drawing.

We may say that in any drawing done in outline alone, the space effect of the contour lines must be emphasized if the drawing is to express form in three dimensions. The silhouette alone must express the axes of the form.

Draw the outline of your egg in pencil. Note how flat it looks.

Now draw the egg in the several positions of illumination. In these drawings include its cast shadow: that is, the shadow thrown by the egg on the table top. If the table is dark you may not distinguish this shadow easily, so put a piece of light paper under the egg.

Draw the cast shadow in such a way that it seems to lie on the table top. This will involve planning its axis so that it agrees with the space movement of the table top; the shadow shape must point in the right direction. Otherwise it is liable to appear in the drawing as a vertical or diagonal plane of some sort.

Hard and Soft Edges

If the source of light is small and close at hand, it will cause the form to cast large, sharp-edged shadows. If it is larger in reflecting area and further away, it will cause smaller, soft-edged shadows. Compare the shadow made by your egg when lighted by a small reading lamp near by, with that caused by a larger lamp with a shade, some distance away.

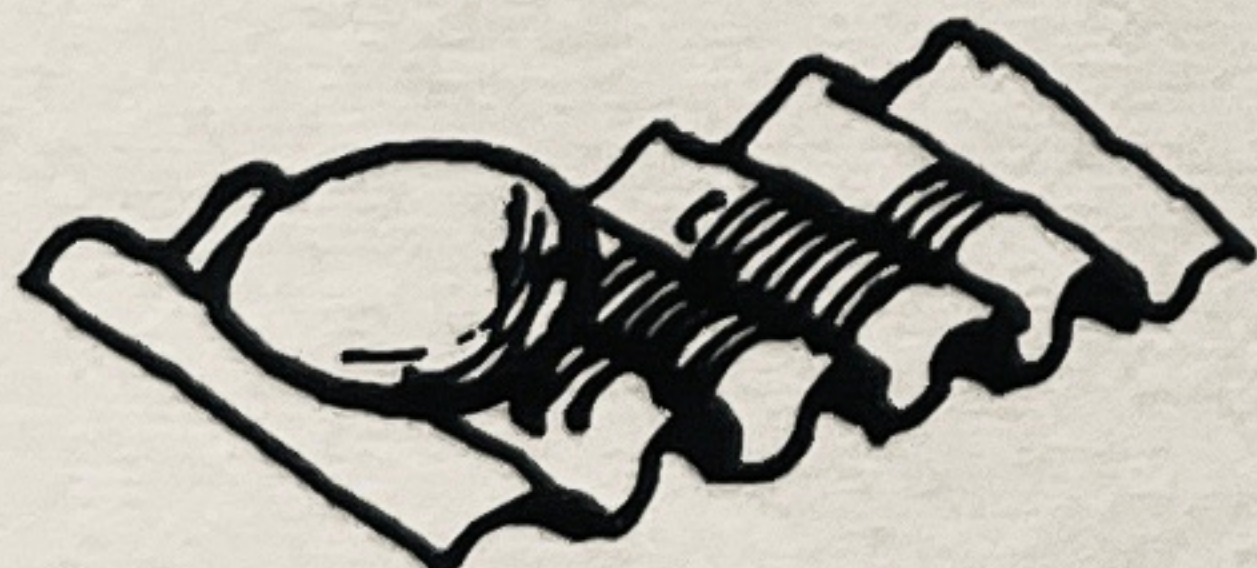
Drapery

Place your egg on a piece of very thin, soft, crumpled material, and compare the edges of the shadows on the material with those on the egg, using light from one side and above. Now place the egg on a piece of crumpled stiffish, heavy material and compare the edges of the shadows.

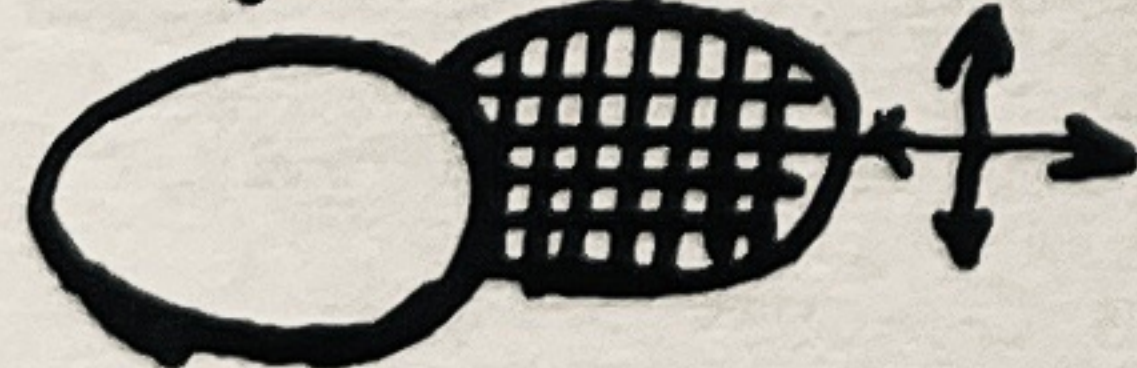
You will see that the slow curves formed by the heavier material cause longer shadow gradations. Where the contour of the egg curves most sharply, its shadow gradations will be shortest. This will be equally true of the drapery.

Practice rendering both in line and in wash some of the gradations you see on the drapery. Practice short, quick curves expressed by short, quick gradations, and long, slow curves expressed by long, slow gradations. Find some which are almost angles rather than curves. Try bending a piece of paper to see which curves produce which gradations.

The nature of the material seen is expressed to the eye by the characteristics of the lights and shadows seen on its surface. We may



Not



The shadow should lie on the form upon which it is cast.

use such gradations arbitrarily to express such surfaces, without regard for the accidents of natural lighting.

The artist is not bound to actual seen illumination as is the photographer. He may create any pattern of light and dark values which best expresses the qualities of the form he has in mind.

Heavier Outline to Express Shadow

In the first assignment we spoke of lines which may have special meanings by variations in width. One use of such a line is that of expressing the shadow side of a form without the use of any gradations at all.

By extension of this idea a thick place in a line may come to mean any part of the form which turns away from the plane of the paper. This is especially true when such thicknesses have a third dimensional quality. They then have some of the effect of space planes.

The combination of thick and thin lines is also used sometimes to express forward and back, in accordance with the principle that objects appear to diminish in size as they recede into space.

Include your two best practice renderings in this assignment.



Forward



* Exercise (b): Instead of drawing "a square foreshortened in lower left hand space," the student may, if he chooses, use the following procedure:

- draw a cube in lower left hand space
- locate top center of cube by drawing diagonals from corner to corner
- complete pyramid by drawing from this center (apex of pyramid) to each of the four bottom corners of the cube.

This procedure may help those students who fail to see the relationship between the drawing of cubes in Assignment 5 and the drawing of pyramids in Assignment 8.

Part I • Assignment 9

Introduction

You have learned to express ideas of up and down, forward and back, and left to right, in structures of simple and curved forms. By now you have developed a degree of hand control; your hand will begin to carry out your mind's commands with less hesitation than at first. The lines of your drawing will have a less cramped effect and you will begin to express freedom and spontaneity in a small degree.

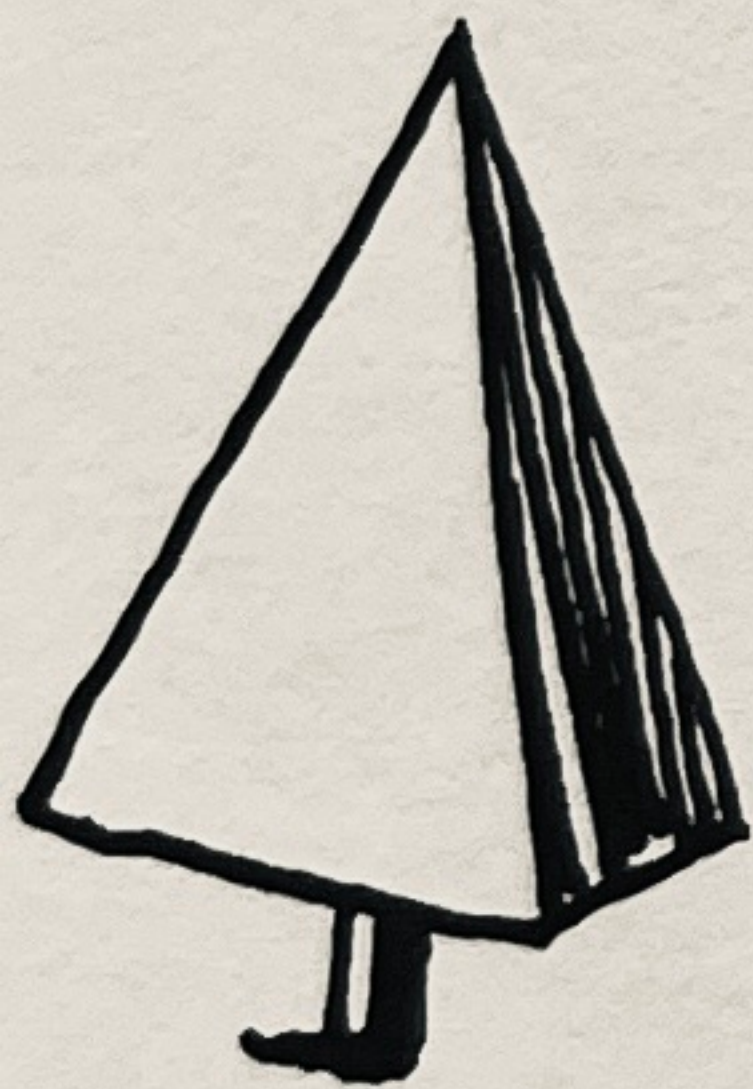
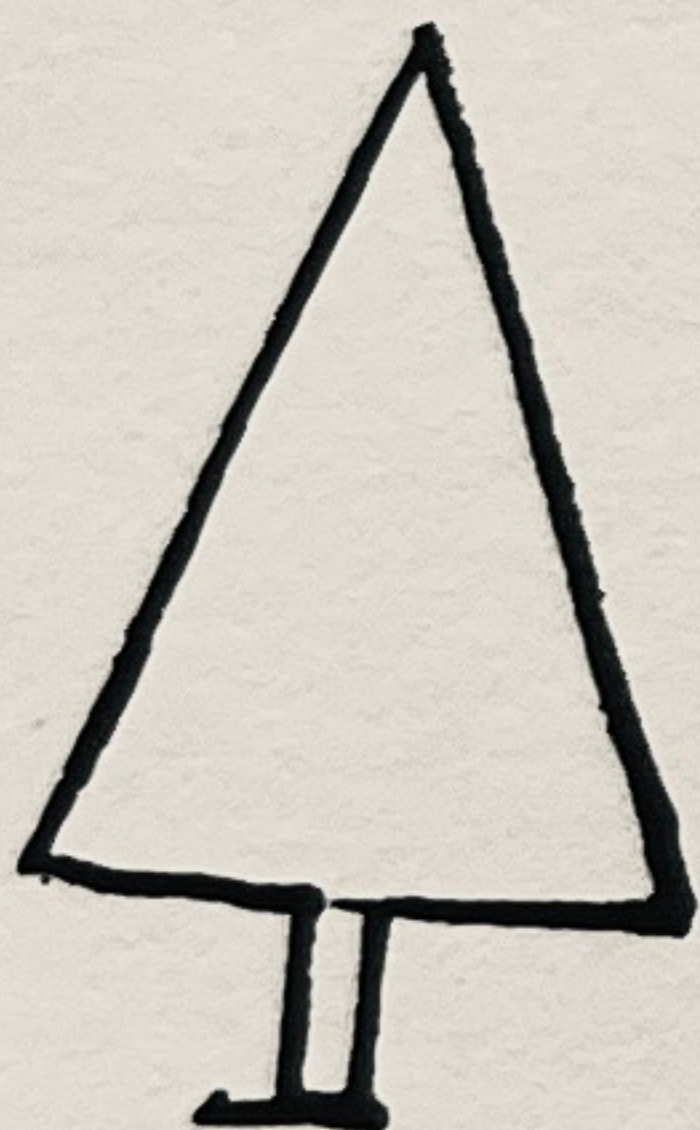
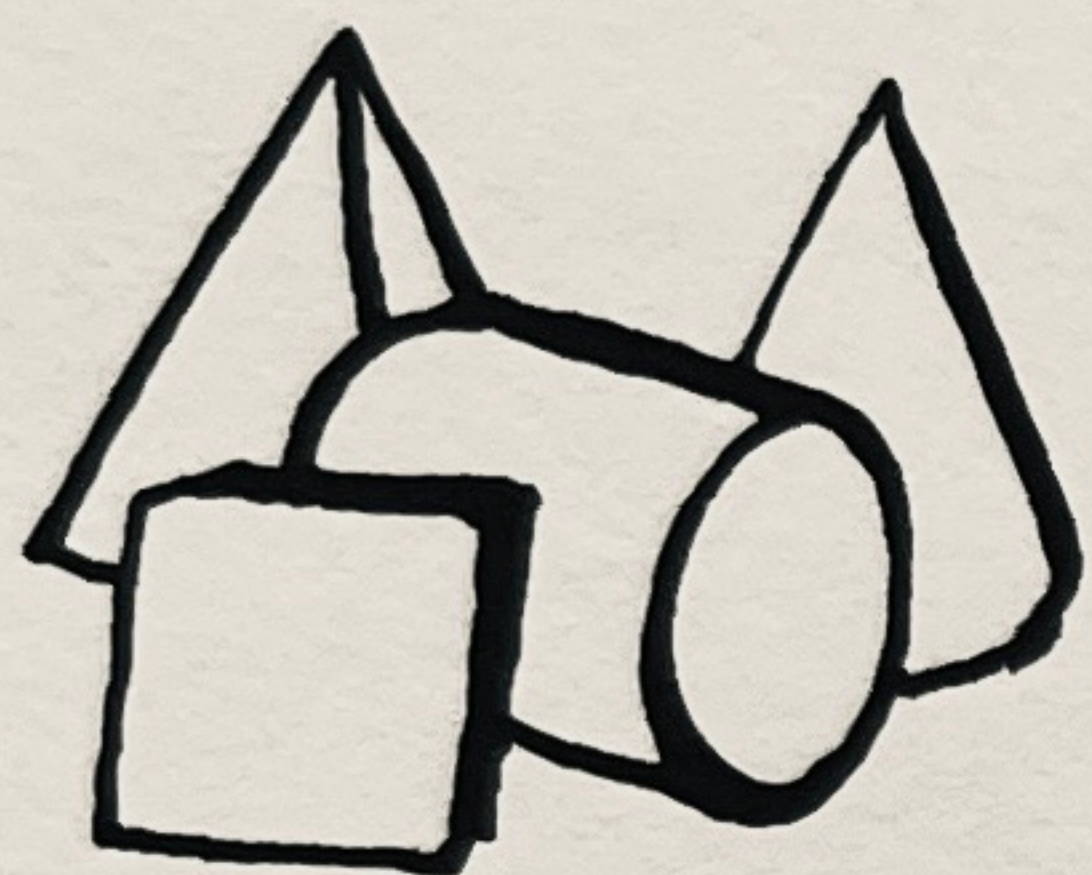
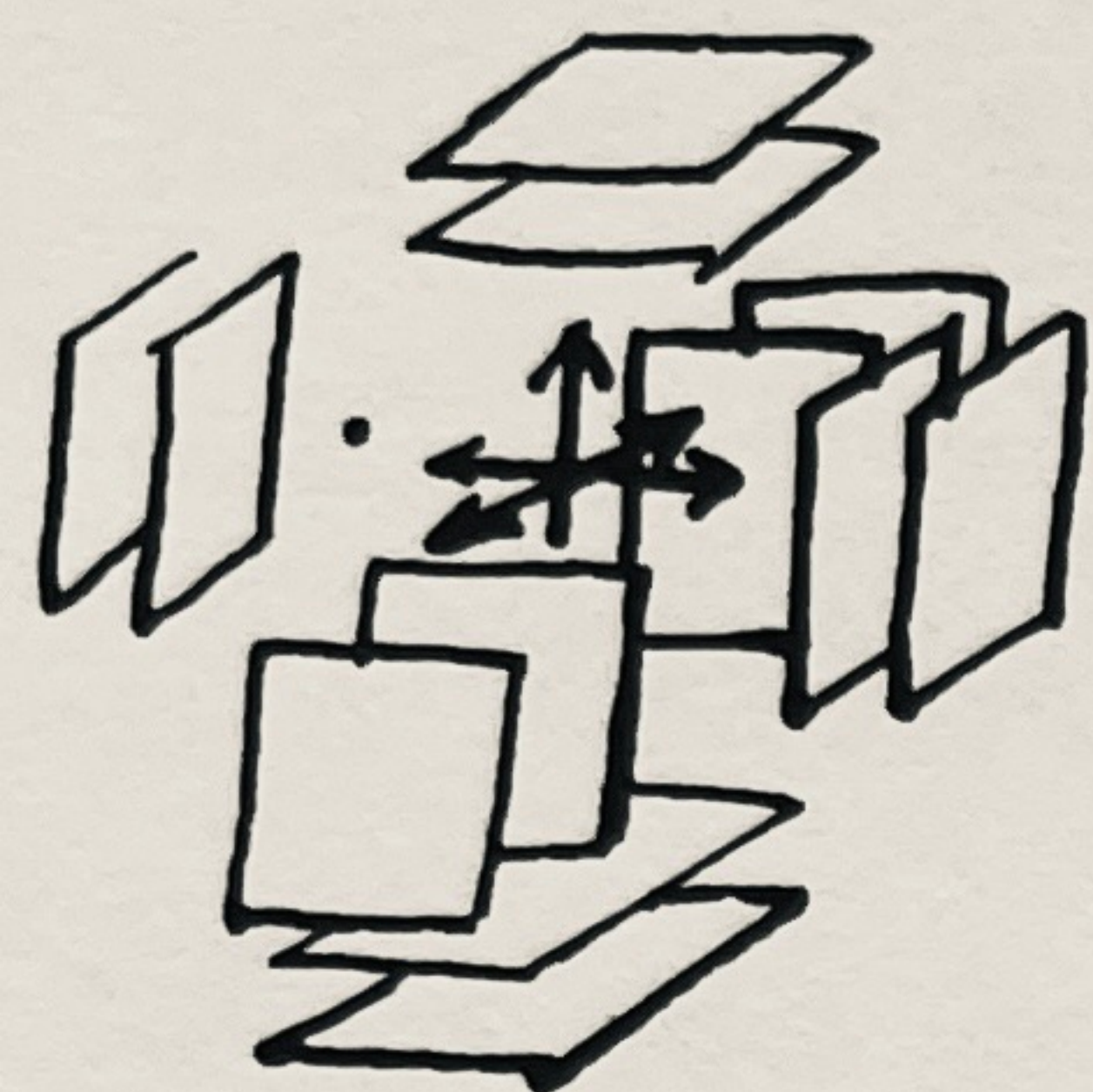
The simple forms you have been learning to draw are like the scales and chords which must be mastered by the pianist. The draftsman, however, is both performer and composer. He must learn to think of these forms clearly, to see them in his mind's eye as well as to execute them and copy them when they are before his eyes.

You should know how to construct the simple geometrical solids "by heart": cube, cylinder, cone, pyramid, and their variations. Unless you have them pretty well in mind, the coming exercises are going to be too difficult for you, for they depend upon this knowledge. You must be able to draw them in relation to each other and in relation to the format within which they appear, and in all positions.

The Greek philosopher, Plato, said about such forms in "Philebus," ... I will try to speak of the beauty of shapes, not, as most people would think, the shapes of living figures, or their imitations in painting, but I mean the products of reason, straight lines and curves, and the flat and solid figures formed from them by the turner's lathe, the plumb line and the square, if you understand me. For these, I say, are not beautiful by virtue of a particular purpose, as other things are; but are by their very nature ever beautiful by themselves, and can give certain unusual pleasures quite free from the itch of desire; and colors possessing this (abstract) character are beautiful and give similar pleasures."

The modern painter, Cezanne, wrote: "Everything in nature is modelled on the lines of the sphere, the cone, and the cylinder, and one must understand how to paint these simple figures, one can then paint anything."

Thus Plato tells us that geometrical forms have a permanent beauty of their own; Cezanne says that if we understand them we can paint anything, and that the natural world is made up of them. These statements are sometimes ignorantly misconstrued to mean that each object should be drawn as an isolated, three-dimensional form, without due regard to inter-spatial relations and the composition as a whole. The space is always part of the picture. In drawing in which these inter-spatial relations are not sufficiently appreciated and developed, the form will sometimes appear as a sort of base-relief projecting from the flat surface of the format. This sort of drawing has been called sculptural drawing, because its compositional relations do not extend to the borders of the format, but are limited to the volume and space actually involved in the modelling of the isolated figure. Both Cezanne's own work and the ideas of Plato and of thinkers that followed him confirm the importance of a visual relativity between all the parts of a composition. There is the sculptor's kind of form, which is developed within the confines of the three-dimensional sculptural block, and there is the painter's and draftsman's kind of form which is developed in the "as if" pictorial space back of the actual plane surface of the format. Each is different from the other, because of the essential differences of the mediums involved: one actually three-dimensional and the



other actually two-dimensional with only the effect of three dimensions possible within its legitimate range. The following exercises tend to emphasize the sculptural approach to form because it is the easiest way of gaining the idea of plastic relations, but later we shall subordinate these block constructions to the pictorial idea of form.

Structure and Character of Forms

Think of a pine tree, a Christmas tree if you like. What is its general shape as seen in your mind's eye? Do not concern yourself now with its separate twigs and branches, but with the shape of the whole. If you were going to carve it out of a block of wood, say, what block shape would you choose in order to be most economical of material?

You may say there are many pine trees, some of them blasted and blown, irregular in shape, and others tall and symmetrical. Which is the typical pine tree? You will probably find yourself thinking of a triangle first, then perhaps of a pyramid or a cone. This is the essential form of the pine tree, and when you set down this pyramid or cone on your paper you are blocking out the structure of this form.

Of course a pine tree has two types of structure: its inner structure of trunk and horizontal or sloping boughs, and its outer structure, the pyramidal or conical outline. Sometimes one kind of structure is more important than the other.

Exercise (a).

Try drawing a pine tree first as a simple cone, and then as a cone with pieces sliced out of it here and there so that you can see some of the inner structure of trunk and branches.

Draw the simple cone pine tree again, letting the sunlight fall on it from the left.

Draw the pine tree which is a perforated cone, and illuminate it from upper right. Put in the dark places where they would occur in the perforations of the cone.

Exercise (b).

If you can get one, place a pine cone in any convenient position in lower right hand space. Find out its essential shape and block it in. It will probably be a variation on a cone shape, involving some curves. Work out the criss-cross texture of the parts of the cone in a simplified style.

If you are unable to get a pine cone, do this exercise with an artichoke, the head of an asparagus stalk, or any unopened bud form.

Try the subject first in line with no shading. Then draw it in another position with line and three values of line and cross-hatch. Finally execute it in five values of watercolor wash.

For variety you may, if you like, do each part of this assignment with a different subject which has structure similar to a pine cone, placing each in a different position.

Exercise (c).

Draw from imagination a flower which has the basic form of a cone, in three positions. If the flower has several concentric rings of petals, the inner ones will form a cone of smaller diameter within the larger cone of the outer petals. Block in the cones first, and then



BASIC PRINCIPLES OF DRAWING



draw the separate petals on the surfaces of the cones which they form. This flower will look a bit stiff, as though cut from paper. Drawing in this way is sometimes referred to as "stylized" drawing.

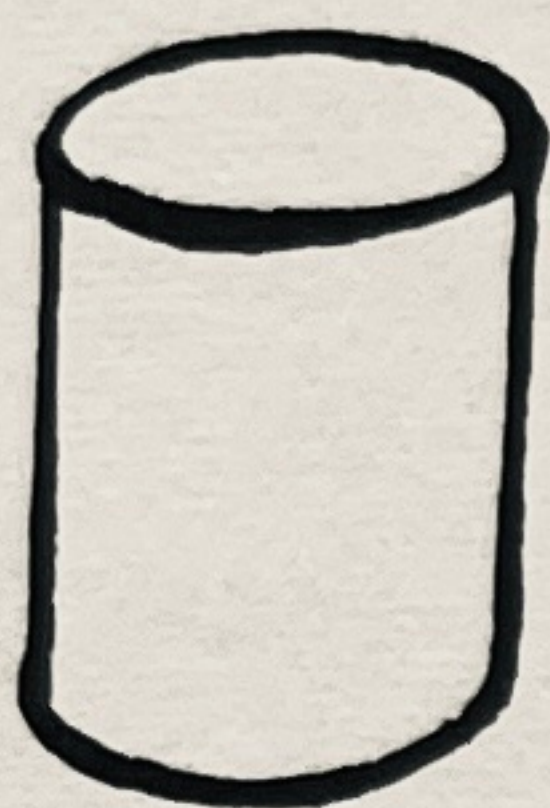
Character of Forms

Character is that variation in essential structure which individualizes an object: which makes it different in detail from all other objects of its kind.

The faces of babies gain in individuality as they grow older. Character in an object is often provided by the marks of use or experience. New tin dippers may be exactly alike, but used ones show dents and spots of rust which give them individual character.

Exercise (d).

Draw a new undented tin can. Then take the same can and dent it thoroughly. (Do not lose the structure of the can entirely. It must still show that it was once a cylindrical form.)



Draw both cans in monochrome watercolor, using five values. You may have to experiment with the illumination of the can in order to avoid the disruptive effects of too many reflected lights in its surface. Remember that the entire gradation from dark to light is of first importance in showing the roundness of the structure. Within this basic gradation and roundness must be shown the evidences of denting. They will appear as minor hollows and bumps, each with its own scheme of lights and darks, but not obscuring the roundness of the whole.

Exercise (e).

Draw another imaginary flower in line. Block in its structure and draw the outlines of the petals on this geometrical form, but now twist and turn each petal a little away from the rigidity of the essential form. Twist and turn the petals just enough so that they do not lie in a perfect cone or circle, but so that a cone or circle may still be found by looking at the drawn flower.



Now put a real flower of the same general shape before you. This time, after blocking in the essential structure, try to draw the petals turned and tipped to give the character of this particular flower.

Overdone character becomes caricature. Over-emphasized structure becomes geometric form, with the beauties of which Plato speaks, but without real relationship to life. Natural objects, and drawings which carry the conviction of nature, on the other hand, partake of both structure and character.

Work which emphasizes structure at the expense of character is often called "abstract." This word in verb form means simply to take away, or from. You abstract the essential form of your pine tree when you take and emphasize this aspect from the entire complex of aspects which make it up.

Artists who have interested themselves chiefly in this side of the beauty of nature have been nicknamed "cubists," because their work is often made up of block forms, the pure, essential structures of things. Nevertheless in their sketches the old masters, Michelangelo, Durer, Rembrandt, and others, have shown that they used the same methods in constructing their pictures. Many of their "cubist" drawings are still to be seen.

Art has always concerned itself with emphasizing one or the other of the many aspects of nature. Often it sacrifices one aspect of reality in order to bring out another. This is abstraction, the act of taking from. It may also be thought of as a process of selective emphasis.

James MacNeill Whistler, in "The Gentle Art of Making Enemies," states the case for selective emphasis:

"Nature contains the elements, in color and form, of all pictures, as the keyboard contains the notes of all music.
 "But the artist is born to pick, and choose, and group with science, these elements, that the result may be beautiful--as the musician gathers his notes, and forms his chords, until he brings forth from chaos glorious harmony.
 "To say to the painter, that Nature is to be taken as she is, is to say to the player, that he may sit on the piano.
 "That Nature is always right, is an assertion, artistically, as untrue as it is one whose truth is universally taken for granted. Nature is very rarely right, to such an extent even that it might almost be said that Nature is usually wrong: that is to say, the condition of things that shall bring about the perfection of harmony worthy of a picture is rare, and not common at all."

All this is just another way of insisting upon the necessity for those adjustments in size, shape, and relative position of forms and parts of forms to each other and to the shape of the format which we call composition. Composition also is achieved by changing around natural illumination, till in the end darks and lights are used, not as they fall in nature, but in the interest of rhythmic movement through the whole picture. In some cases such painters as Rubens are found to have cast shadows toward the sun!

Hence all the experiments with illumination which we have recommended. Sometimes the natural light as it falls on a form so cuts it up with shadows and reflections that its structure is disrupted for the eye. Such light planes must be edited by the artist, and others which do display the essential form substituted for them. Your shiny tin can is this sort of subject.

Exercise (f).

Try a monochrome watercolor of some very shiny object. Place it in various lights until you get one which shows that it is shiny, and yet does not disrupt its structure. You may still have meaningless reflections. Leave them out unless they are needed to contribute to the idea of the form you wish to express. A few will probably be sufficient.

Part I · Assignment 10

Irregular and Complex Forms

Man's mind and sensory equipment do not permit him to deal directly with infinities. We must measure in order to compare, and we must compare in order to think. One of the easiest of thinking processes is that of comparing something we know with something we do not know. The first known units of measurement were derived from the dimensions of the human body.

Early in life we develop fairly clear ideas of roundness and squareness, and of the simpler geometrical figures which may be built from these basic forms. When in doubt about a form we are likely to compare it first to a part of ourselves, and then to a square or a circle. If they do not fit, we tend to use some other equal-sided figure such as an equilateral triangle.

It is with increasing mental uncertainty that we leave this familiar ground and try to describe or imagine figures which have no equalities, and which vary from our familiar standards of measurement. We describe the variable outlines of an apple as "sort of round," and of a head as "sort of egg-shaped," referring them back to abstract ideas of simpler forms.

How shall we deal in drawing with such a thing as a crumpled piece of stiff paper? Or with the infinite curved forms of a cloud? Or with the intricacies of a leafy branch?

If we have had some training in drawing we may block out the simpler aspects of these things mentally, and begin our sketching with a complex idea of the form already pretty well developed. But in earlier stages of training it is safer to begin with the forms we already know, and step by careful step approach the complexity of the shape we do not know. (In drawing this involves a good deal of erasing, so that a student drawing is seldom so neat as that of a trained worker.)

The process is very much the same as in sculptural stone cutting. The sculptor plans the main axes of the shape he wishes to cut from stone, fits them mentally to the existing axes of the stone, and proceeds to rough in the block forms by chipping in from the surface. For a long time the statue remains an assemblage of simple geometrical shapes, more and more of them appearing as the cutting goes on. Six-sided cubes have their corners cut away to become twelve-sided blocks; the corners are again removed to increase the number of sides. This goes on until the surface conforms to the smooth contours desired.

In building a figure with clay the sculptor's method is similar, so far as geometry is concerned. But in this case he begins inside, from an armature, or inner structure, which carries out the main axes of his intended figure. To this armature he applies large and then smaller pieces of clay until he approaches the surface he wants.

Always the method consists in approaching the complex by way of the simple; in thinking of the form involved first in its major axes and proportions, stripped of detail, and then refining it, step by step, until a great variety of forms is developed. These forms are nevertheless still dominated by the first simple idea of up and down, right and left, forward and back: the essential block form.

It is from this sculptural process that artists have adopted the word "plastic."

Plastic Values

The word plastic has the same root as plaster. The term was first applied to any substance which was "fit for moulding." When artists speak of plastic values they refer usually to rhythmic relations achieved by moulding or modelling forms, whether sculptural three-dimensional forms, or the "as-if" three-dimensional forms in a painting. The modelling of a surface is the final refinement of the block form, and is accomplished in drawing by a delicate manipulation of the medium (as pencil or watercolor) to differentiate slight variations in the directions of the surface.

If a drawing has no plastic quality it simply means that this manipulation has been neglected or has not been successful; that the surfaces of the forms have no life or variety; that the treatment of the spaces between the forms has failed to express space; and--more than

these--that the whole drawing has failed to achieve an effect of rhythmic order, in pictorial space.

Plastic Silhouette

In outline drawings, of course, the expression of surface variation must be accomplished by the manipulation of the outline itself. This is done by carefully planning the spatial meanings of the outline, by providing it with overlappings wherever one hump of the form comes in front of another.

A plastic silhouette is not achieved merely by recording the optical image of the outline of the form. If we project the shadow of a form on the wall, the edge of that shadow will seldom convey any idea about the roundness and volume of the form which cast it.

Some parts of the silhouette of a form are more significant than others. The Egyptians knew this, and arrived at the convention which we recognize as typical of Egyptian drawing because they felt that they could best present the idea of a head by showing it in profile, of a pair of shoulders by showing them from the front, and so forth. Look at a reproduction of an Egyptian wall decoration and see this for yourself. These artists did not trace the outline of a man as it was accidentally presented to their eyes; they planned a significant silhouette which suited each separate part of the figure.

Exercise (a).

Take as your model an irregularly shaped rock. Study its silhouette. Turn it before your eyes until the outline presented seems to convey best the idea of the shape and proportions of the whole rock. If it is longer than it is wide, you will find that a view which presents at least some of the long side will be most useful for work in pure outline. Some forms may never be completely expressed in terms of pure outline, because recognition depends almost entirely upon their inner structure. In such a case, you will be forced to use more lines within the silhouette, beginning with those parts of the silhouette which are overlapped by other lines.

If you wish to make a pure outline drawing you will pretty well be forced to choose a view close to a front elevation of the longest side of your rock.

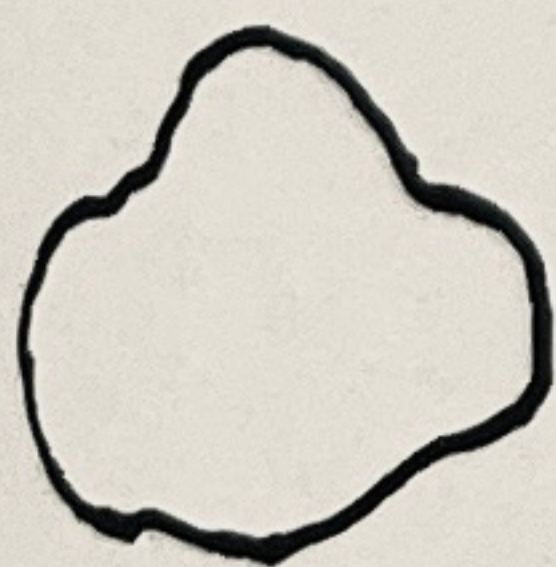
Make an outline drawing of this front elevation. The rock should be placed so that it is level with your eyes.

Draw also the plan of the rock, and the side elevation or end view. Use pure outline with no thickening or thinning of line and no overlappings.

Of course, no one of these silhouettes will tell the complete story of the form of the rock. But jointly they tell a good deal. Is there any way to get more of this information into a single drawing?

Exercise (b).

Place your rock in lower left hand space, with its longest axis agreeing with the space-diagonal direction of pictorial lower left hand space. Now the end, top and side of the rock may be seen. If you trace its outline as it now appears you may get some plastic effect in your drawing and you may not, depending upon how well the traced outline expresses the space planes of the top, side, and front. Make such a copied outline drawing.



BASIC PRINCIPLES OF DRAWING



In another drawing, emphasize certain parts of the movement of the outline, so as to carry out the space movements of the essential planes. This outline will appear much more plastic than the other.

So far you have used no overlappings. Review Assignment 7 on the movement of curves which twist and turn away from the paper surface.

Exercise (c).

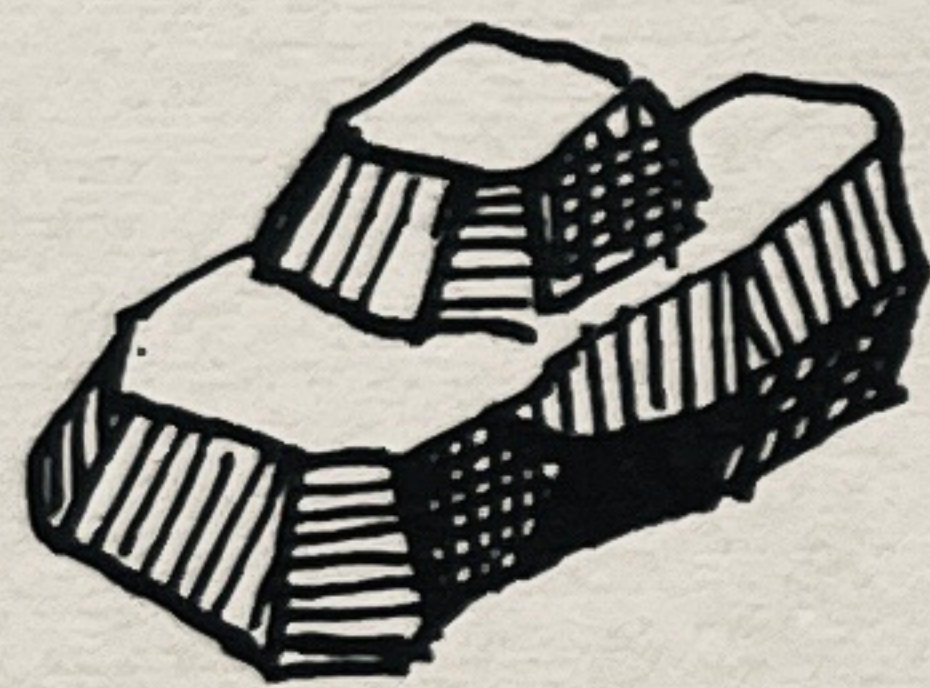
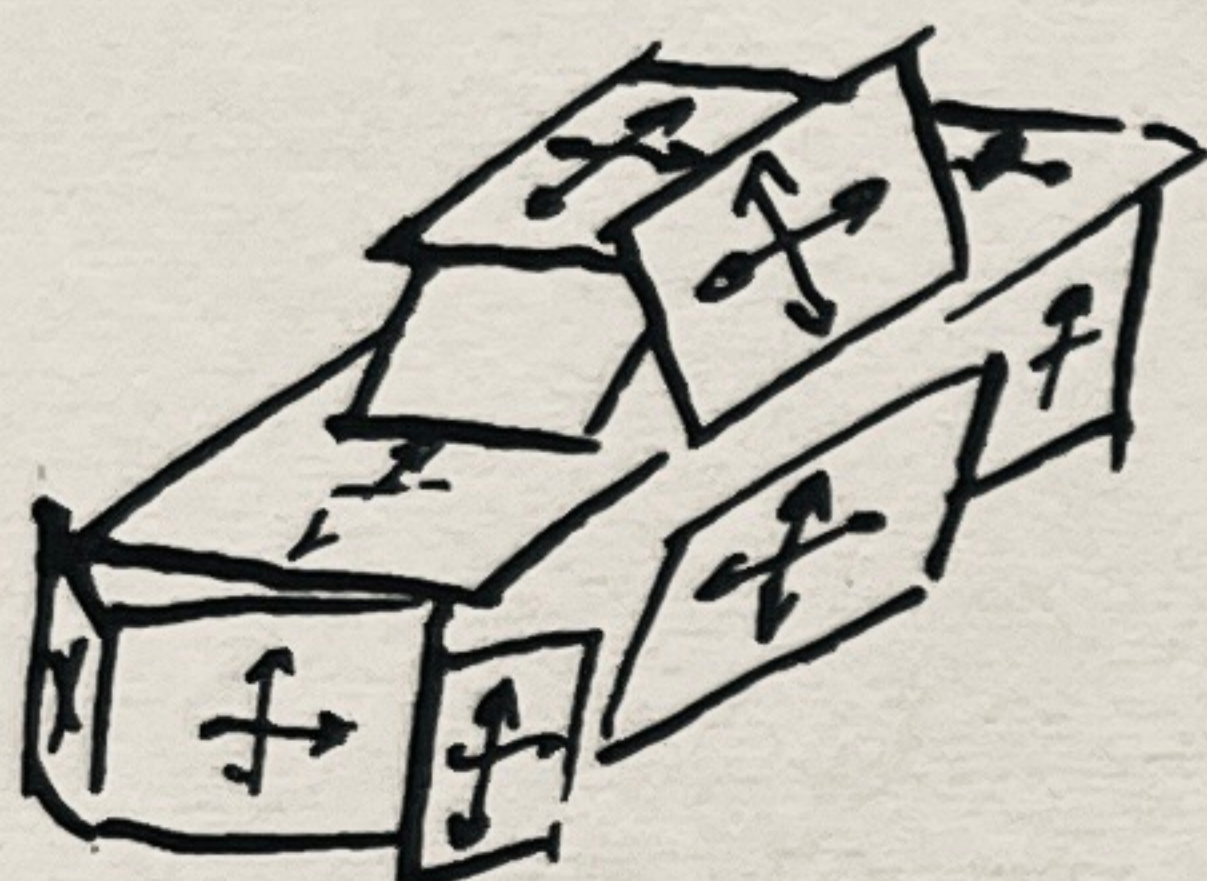
Draw the rock in the same position, this time adding to the silhouette the overlappings which appear where one of the surface bumps on the rock shows behind another.



You should now have a silhouette which presents ideas of three-dimensional form quite clearly: through its general space movement, in the agreement of the main axis with the characteristic diagonal of left hand space; through the pushing and pointing of its curved or angular outline in spatial directions; and through the overlapping of its planes as they appear at the edges of the form.

Exercise (d).

Draw the rock again, continuing the construction of the inner forms until you have described its entire surface in outlined planes. It will look something like a carelessly peeled potato, with the knife cuts blocking out the form roughly. Each knife cut, or plane, has its own shape and its own major and minor axes. Planning a drawing for bold and direct painting involves exactly this sort of blocking in. The individual brush strokes will make just such shapes.



Make another silhouette drawing in which you use your monochrome watercolor to make similar planes. Do not merely fill out the outline with the watercolor, but put down puddles of paint directly, with no preliminary drawing, trying to make them express the same plane movements in space as do your outlined planes. Think of knife cuts; you are carving this form out of space. This will help you to follow the form with your brush strokes, so that they will tend to have the right directions.

Use any simple value scheme, in which you progress from light somewhere to the left, to dark as you come around the form.

We have built up the rock in outline in space, and in planes in space. Now we need to know how to express the nature of its surface, within the planes. This exercise will take a bit more skill and manipulation than were needed for previous watercolors, because we shall try to express not only the chief planes, but also the surface plasticity or modelling, which will appear as soft gradations from one of the chief planes to the next.

Here we must so manipulate our watercolor as to keep soft edges between the main planes without losing them. We know that we can do this by keeping the edge in question wet, and letting the darker plane flow into the lighter one a little. This process may be controlled to some extent with your brush if you will pinch the water out of it and take up some of the color whenever it seems to be spreading too fast into the light plane. But this technical effect of gradation is best accomplished by setting down just the right amount of pigment of the right wetness along the edge of a plane which is darker and not yet dry at the working edge.

The proper execution of an irregular gradation depends first of all upon the ability to execute a regular gradation. Review Assignment 8 on this subject.



Exercise (e).Surface Texture

We have given no attention as yet to the rough or smooth texture of the surface of the rock.

If the rock with which you have worked happens to be a smooth one, find another with a crystalline, gravelly, or porous surface. Or work with a large walnut instead of a rock.

Make a drawing of the walnut (or rock), in which you copy the all-over pattern of the texture in outline. You will find that the textural pattern seems to turn away from you with the surfaces which turn away from you. If you are able to follow the form of the walnut with the textural pattern, the texture will add spatial effect to the outline of the nut. If, on the other hand, you draw the texture so that it does not move with the surface, it will tend to have a flattening effect.

Try two drawings, in one of which you render the texture as flat and two-dimensional, in the other attempt to make the texture follow the round surface of the nut. In this connection, look at the pattern in a piece of drapery laid flat, and in the same piece of drapery held around a curved surface.

Later in this course you will study the mathematical principles for projecting ornament on curved surfaces, so that you may use them when you desire that kind of accuracy. Here it is more desirable, however, to work freehand, for reasons previously given.

Exercise (f).

Place the walnut or rock in strong light from one side. A small, low light source will be preferable, such as that thrown by a beam of daylight coming under a partly pulled blind, or by a reading lamp which concentrates the light in a given direction. You may improvise a spotlight by covering such a lamp with a cone of paper.

Visual texture is most apparent when light does not illuminate the form from directly above. The more horizontal the light rays, the longer are the shadows cast by the small bumps across the hollows of a form.

Notice that in the place where the shadow side of the walnut meets the light side, the texture is most apparent. Try this out with an orange, and with various sorts of drapery. Notice that the same is true of the shadows and lights on hair. Look out at the spots of sunlight and shadow in the tall grass. At the edges of the shadows the details of nap or roughness of surface are most apparent to the eye, because here they are brought into highest contrast in terms of dark and light.

Now render your walnut in monochrome watercolor, dark and light against a grey ground. Simplify all the texture in the shadow, and all the texture in the fully lighted side. But where light meets shadow there must appear, instead of a smooth gradation, the textural pattern, blending into the dark on one side and the light on the other.

Try similar renderings of two or three other rough-surfaced objects or materials, and include them in your assignment sheet.



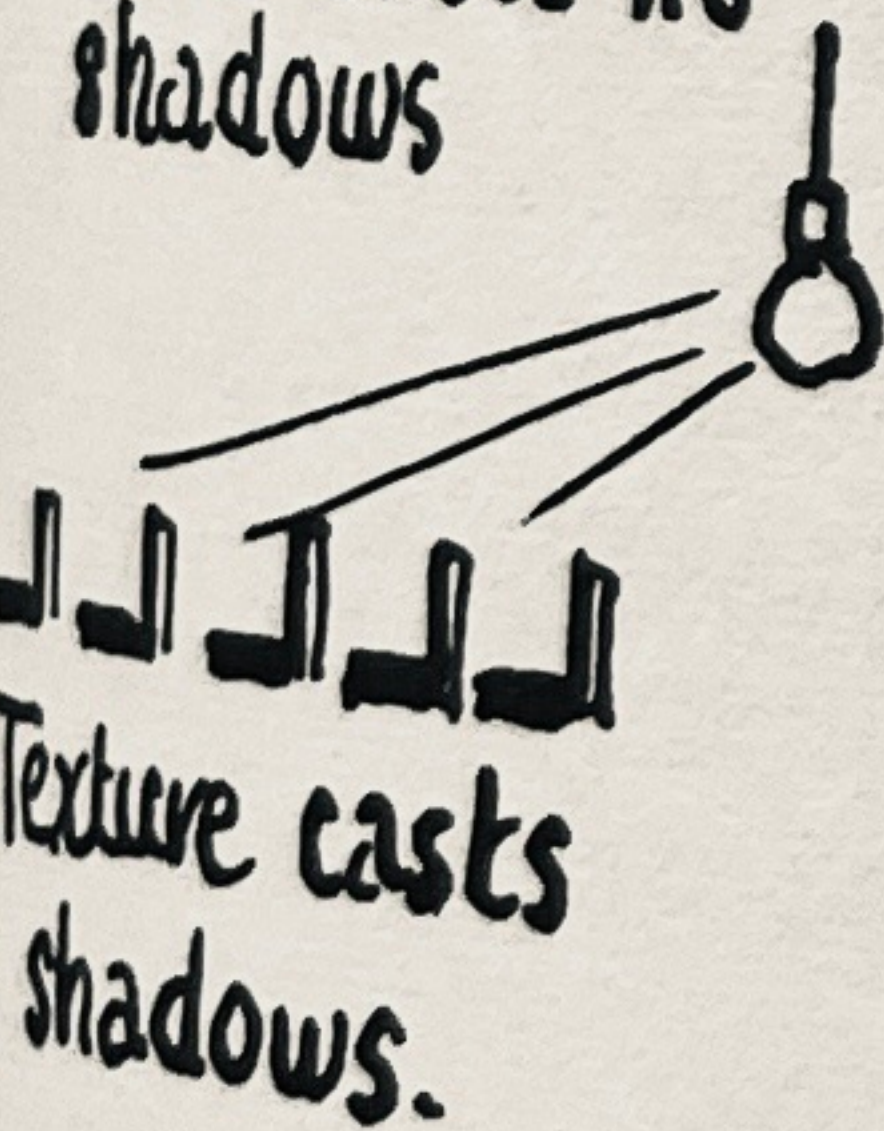
Texture follows Form.



Flat Texture



Texture casts no shadows



Texture casts shadows.



Part I · Assignment 11

Introduction

In previous assignments you have learned to look for the essential forms and structures behind surface variety. You have learned to render those simpler structural forms in space drawings. The variations in and around the structure have been found to be the visible indications of individuality and character; the study of texture as a form of surface variety has been begun.

In the last assignment, working with a rock as a subject, we found that it is not always easy to discover a single geometrical form--like that of the pine tree--from which we may evolve a characterful shape. Many structures are composed of several geometrical forms fastened to each other or interpenetrating, sometimes at odd angles.

We must learn therefore to draw simpler forms in relation to each other and to the format first, then simpler forms in more complex relations, then the simpler forms perforated and modified in shape and related to each other--though tipped and turned--in pictorial space within the format.

Turn back to the first diagram that appears at the beginning of Assignment 9. Here we see a diagrammatic expression of the unified relation which should be evident between forms which are up, down, right and left, and forward or back. It is easy to see that this diagram is derived from the simplest form which it is easy to imagine in three dimensions, the cube. We think of a solid cube as one thing, unified. But suppose the cube to be hollow and its six sides separated at their edges and all moved away from the center of the cube. If they remain in evident relation to the eye, they will still form a visual unity, though the unity is made up of different parts separated by spaces. This kind of oneness must also be one with the picture format. We must master this unity of separated parts in order to progress to the successful composition of pictures.

Here the study of what the artist calls still-life comes to our aid.

Still Life Study

A still life drawing or painting is so named because it is supposed to suggest life and action through the depiction of inanimate objects. A battered and muddy pair of riding boots tell of the activities of their owner; they are inanimate, but they have the character of use.

The first still life works of any great importance were painted by Dutchmen, who loved to depict a loaded banquet table either before or after the banquet. Such paintings came to be fashionable dining room pieces during the Victorian period, and were widely and often very badly copied. You may have such a still life painting somewhere in your attic.

In the practice of such painting, artists discovered a subject matter the use of which has solved a great many of their study problems.

Why is still life drawing and painting especially useful for study?

In the first place, it is useful because we are able to control the light which falls upon the subject. When a beginner starts to draw and paint out of doors, he may be confused by the slow but continual change of light which is due to the movement of the sun. When an artist works directly from landscape subject matter, he is seldom able to work on any one subject for more than two hours at a time, because of the complete change in effect which occurs as the shadows move with the sun. He learns to sum up quickly the effect of dark and light which he wants, and to work arbitrarily to that one scheme. Or he finishes his painting in the studio, providing his own scheme of illumination.

Exact fidelity to all the accidents of light and shade as seen in landscape has never been practised by painters of any importance; they prefer to interpret, to put the darks and lights in the picture where they will best emphasize the aspects of the forms which interest them.

The beginner is seldom sure enough of himself for this. He needs a lighting scheme which will stand still for him, so that he may study his subject at leisure, select what he needs, and correct those accidental planes of natural light which do not interpret the form to suit his eye and mind.

Studio Light

Still life may be set up under controlled light, such as that which comes through the north skylight of the painter's studio. If he has no north light, he will often cover a window with frosting, or with light cloth, to prevent the direct and shifting rays of the sun from disturbing him too much. This is the lighting scheme which is said to have been used by Leonardo da Vinci in painting the "Mona Lisa" portrait: He roofed in a small courtyard with stretched, thin white cloth. This gave him light from above, coming from a great area, hence diffused and casting no sharp shadows. He avoided vagrant reflected lights by painting the walls of the court a dark, light-absorbent color.

North light is generally considered excellent for black and white work, but some believe it too "cold" for work in color. This is because it is light which comes from the blue sky. Some artists correct this "coldness" by screening the skylight with material of a "warmer" color. Others use diffused sunlight, as did da Vinci.

For our work in black and white, a north window open to the sky will furnish the best source of constant light for daytime work. The lower half should be screened so that most of the light comes from above the eye level of the artist as he works. Old fashioned, high-ceilinged rooms with high windows are generally best for art work.

With a still life set up under these circumstances, shadows will fall in a way most apt to be correctly interpreted by the eye.

Variety in Shape and Surface

We have seen that the same principles of drawing are employed in depicting a box as in depicting a house; that the contours of a hand may be very like those of a hillside; that a pine tree might be evolved from a cone, and the texture of a mountain be found in one rock. Still life study enables us to bring together forms of all shapes and textures, and to study them in the convenient surroundings of the studio.

Scale

The only important difference, aside from the constancy of light direction, between still life and landscape study is in depth and scale.

This is an advantage for study, since the great height, width, and depth of the full panorama of landscape are apt to produce exaggerations in perspective, with which the student must be prepared to deal. Still life subjects may be arranged to allow a gradual approach to these problems, beginning with fairly shallow relations in depth which present no such great difficulties as the illusions and distortions produced by exaggerated perspective.

Still Life Stands Still

It is of great aid to the student artist to be able to take up his work where he left off, and to find his model still in place. When working outside at landscape subject matter, things are continually happening to change appearances. The sun will go under a cloud, a vehicle will stop directly in front of the artist, cutting off his view; or workmen will suddenly begin to tear down the old barn he has chosen to draw.

When working from living models, in the studio or out, some movement is bound to occur, even with the best of professional models. This is not very disturbing to the artist who is sufficiently experienced to compensate for these things, and to draw to some extent upon a disciplined and well provided memory. It is so frustrating to the beginner, however, that a few such experiences may cause him to give up study altogether.

The elements of texture, color and form in all these things may be studied separately and mastered in still life form, so that distractions will eventually be overcome.

The physical and mental comfort of the artist himself is a matter of greater concern than is generally realized. One cannot do one's best concentrated thinking when inadvertently perched on an ants' nest, or when surrounded by a well-meaning crowd of questioning children.

Briefly, the beginner will make better progress by practicing on still life subject matter to overcome his awkwardness and uncertainty, than by plunging immediately into the complexities of figure or landscape work. He should curb his desire to do "greater things" until he has mastered the elements.

How to Set Up a Still Life Study

The subject matter of a student's still life should not be chosen because of sentimental or romantic associations. The vases and bowls need not be of the rarest and finest ware, the draperies need not be imported. Anything which has interesting form and texture may enter into a still life study. Even if it is not particularly interesting by itself as to form and texture, it may become so in contrast and relation to the other objects in the still life.

The secret in setting up a technically interesting and useful still life lies in providing contrast between its elements. The combination of something tall, something short, something curved, something angular, something shallow, something deep, something narrow, and something wide, will furnish diversity and contrast in form. Something rough, something smooth, something shiny, something dull, something opaque, something transparent, something light, and something dark, will furnish contrast in surface quality.

Remembering that good material for making up a still life study is everywhere, let us talk about the one which is now before me, not because you must duplicate it, but so that you may go about setting up your own still life materials to similar advantage:

A Still Life Described

There is an apple box on the floor against the wall. It is so arranged that I can seat myself about six or eight feet from it, parallel with it. It happens to be a little to my left.

Over this apple box is loosely draped a piece of burlap, and one corner of the burlap has been thumb-tacked to the wood of a door jamb, so that it falls naturally and accidentally in folds, first following more or less the plane of the wall, and then forming a transition curve as it changes to the level surface of the box top which is at right angles to the wall. It changes direction again as it falls over the edge of the box. Notice that the burlap furnishes a dark color and a rough texture.

Placed off center toward the front of the box is a light-colored, shiny, cylindrical vase, about a foot and a half high and six inches across. Here is a cylindrically curved, tall and shiny form. The light is falling in such a way that the shadow of this vase falls across the folds of the burlap on the box top and on the wall.

Standing half in and half out of this shadow and leaning against the vase is a chunk of split wood. I can see the end grain where it has been sawed, and the side grain where it has been split. The split is fresh and light-colored, whereas the sawed end is quite dark, even darker than the burlap. This chunk of wood is both rotated and tipped with relation to the wall and to the horizontal box top. It is roughly reminiscent of a block form.

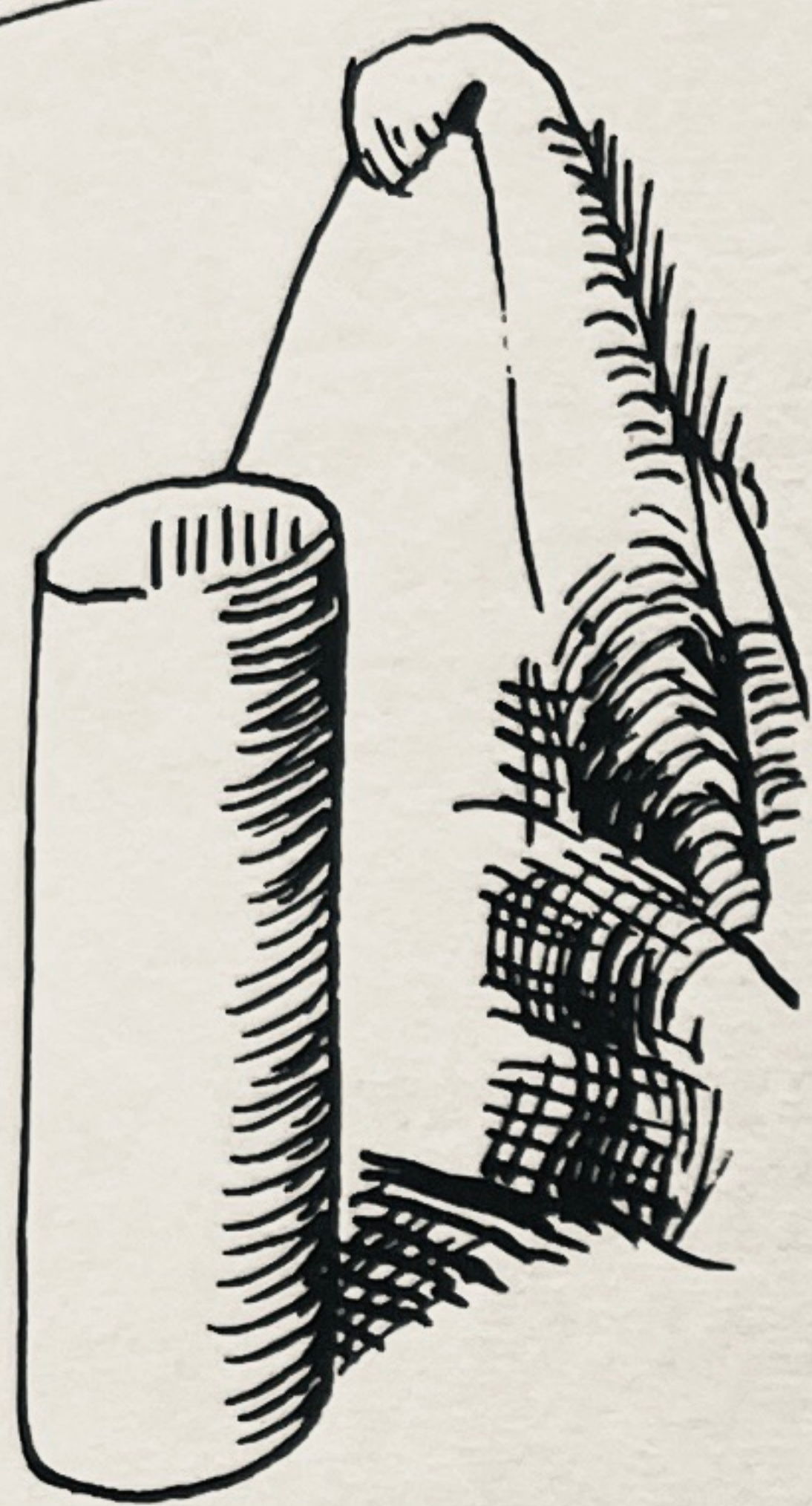
A rectangular rusty tin can with some of the label still sticking to it lies on its side to the right and back of the chunk of wood. It is rotated relative to the wall, and the top, which has been partly cut out by a can-opener, forms a twisted and turned plane.

A crumpled piece of grey blotting paper lies alone and to the right of this group of objects. It presents an angular surface, like a mountain range.

Exercise (a).

You will find that all the shapes you see here are familiar. You have drawn them separately before. The new problems are those of drawing these objects in consistent relation with each other in space, and of rendering the variety of textural characteristics of the surfaces.

Attack the space and volume relationships first, in light pencil outline, so that you may easily erase. If you have provided yourself with charcoal materials for extra study, so much the better, for you will be erasing a good deal at first. You may use the method of pencil "thumbnail" sketches to great advantage. That is, make a series of small oblongs of the same proportions as those planned for your large, finished drawing, and try first one and then another freely blocked-in sketch, aiming at the large units of form and of light and dark, rather than the details. When you have a thumbnail sketch which suits you, develop it on your final sheet.



Space Between Form and Background

In the still life which I have described there is a diagonal shadow falling from the cylindrical vase, across the burlap on the box top and onto the plane of the wall. The folds of the burlap twist the shadow shape as it follows their contours, instead of lying quite flat. The proper utilization of this dark shape will be of great aid in getting the space effect between the upright cylinder and the wall.

Tension

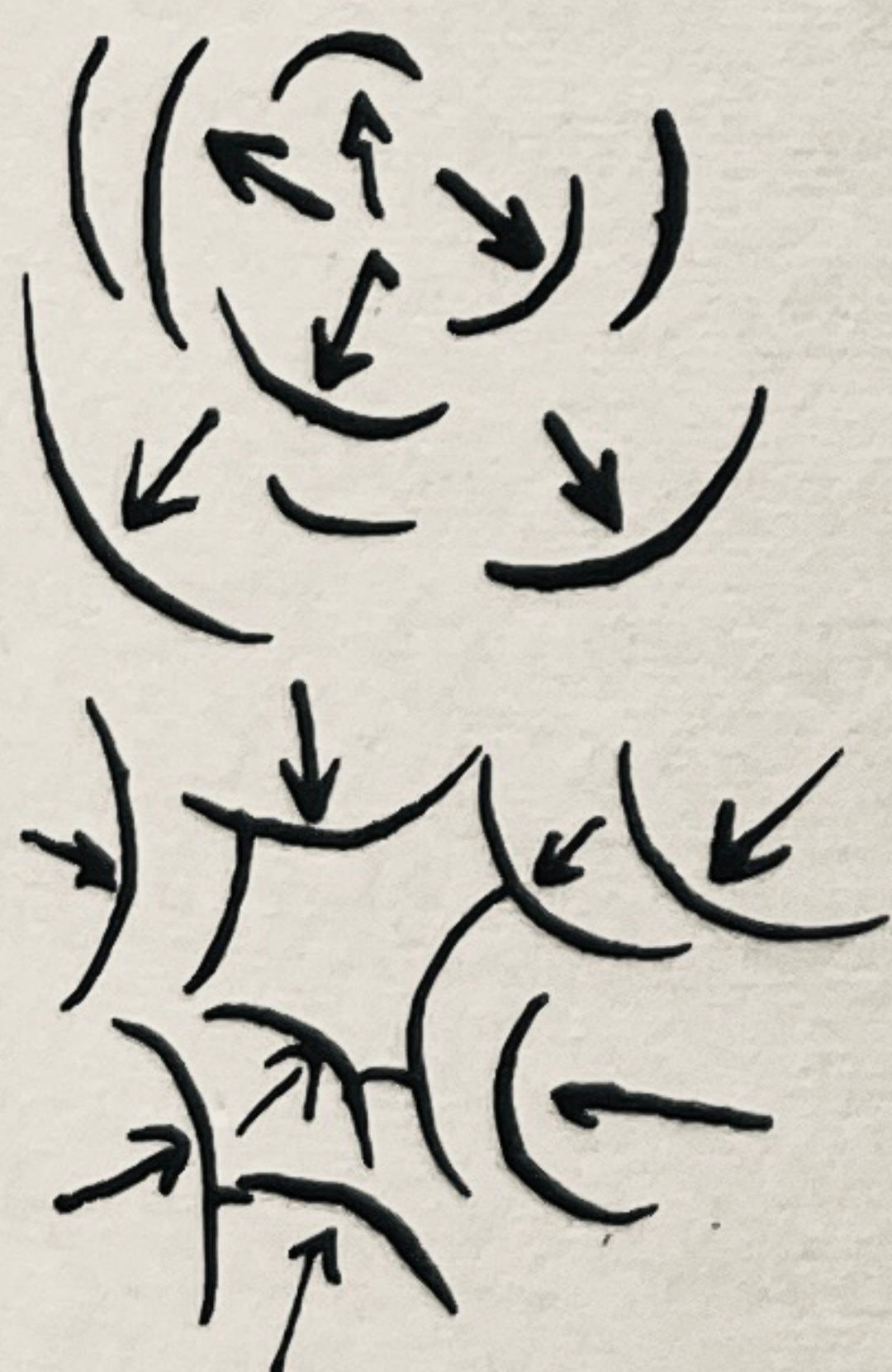
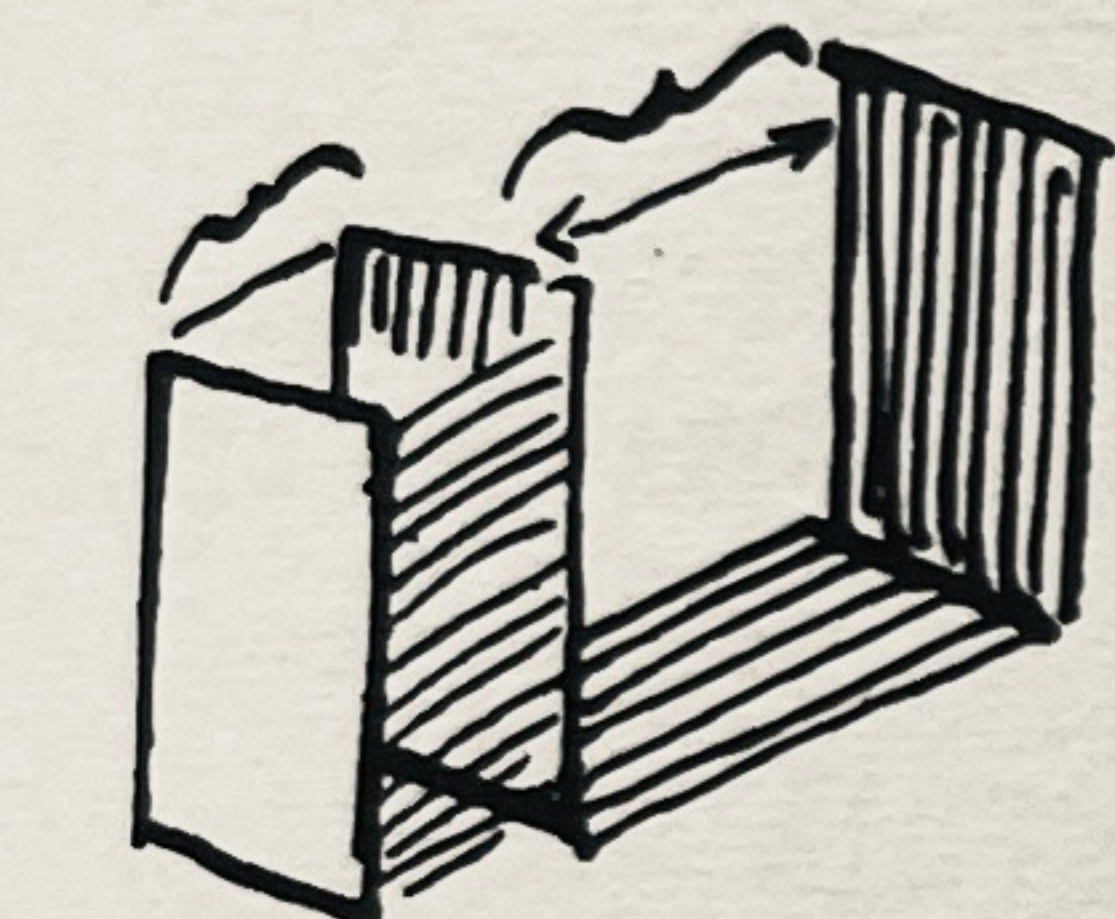
The existence of tension between planes in a picture is necessary in creating space effects. Tensions are the result of visually evident relationships between planes. They exist between the plane of the format and the planes of the forms presented as if back of the picture surface. Tensions exist in a horizontal and vertical direction with the edges of the format and these have the effect of creating a two-dimensional pattern, or unity. Tensions exist between all evidently related points, lines, or planes within the picture. In the properly composed picture they bind the parts of the picture together with each other and with the format and produce the effect of harmonious unity. They are invisible, but felt bonds between the parts of the picture, producing a three-dimensional unity of effect.

Physicists tell us that even objects which we accept as quite stable and solid exist in this form only by grace of a balance between the forces within them and the forces which surround them. For instance, the air pressure upon the wall of a tin can must be equal within and without if the can is to hold its shape. When we exhaust air from it those parts which are not structurally strong enough to resist the pressure of the atmosphere bulge inward; this will continue until air is admitted to equalize the pressure and equilibrium between outward and inward pressure is re-established.

Buds and fruits swell in the spring as the pressure of rising sap within pushes their walls outward against the pressure of forces without. A seed will swell till it cracks a block of cement.

In the autumn, as the life force in a plant runs lower and lower, it shrinks, wrinkles appear in its surface, and it develops inward-pushing concavities rather than outward pushing and thrusting convex forms of the growth in spring. The equilibrium of forces which determine the position of the surfaces has slowly changed in favor of those outside.

The world inside the picture is an "as if" world, as we have noted before. Within its narrow limits an "as if" life goes on. Although the surface of a picture is a plane figure of two dimensions bounded by a frame, we have discovered that it is possible to animate it by the use of symbols for the forces of the three-dimensional natural world. We may not only achieve space and volume effects by the orchestration of our lines and planes, but we may make the volumes suggest expansion or shrinkage by the way we draw them. Volumes may sag, fall inward, or bulge and press outward or upward according to the treatment of the planes upon



their surfaces and the lines at their edges. An old, careworn face, and an old water-and-wind worn mountain exhibit the same sorts of sagging and inward pushing surfaces and a healthy, youthful face and a growing fruit have much in common. We used to call a good looking girl a "peach."

But let us return to the consideration of the larger tensions which relate the big parts of the composition of the picture, for the smaller ones, which determine the nature of a surface are best understood through their study.

We know that the overlapping of recognizable shapes is the most powerful space symbol. However, that idea has not yet been examined very far. What occurs when we look at two overlapping planes?

We find that the mental operation is really one of comparison. We judge the relation of one to the other. It is this relation which creates the pictorial effect of space between them. There is no actual space, there is only the mentally-created space: subjective space.

Subjective Lines, Subjective Space, and Volume

When we see two related points and think of a line between them, that line is a subjective or mentally-imaged line. It does not exist objectively--that is, in the real world--but it is real to the mind.

What causes us to think of this line? It is the evident relationship of the two points. If they were too far apart, or not evidently related otherwise in the field of vision, no mental line would be created by the mind. We must be able to think of them together to think the line.

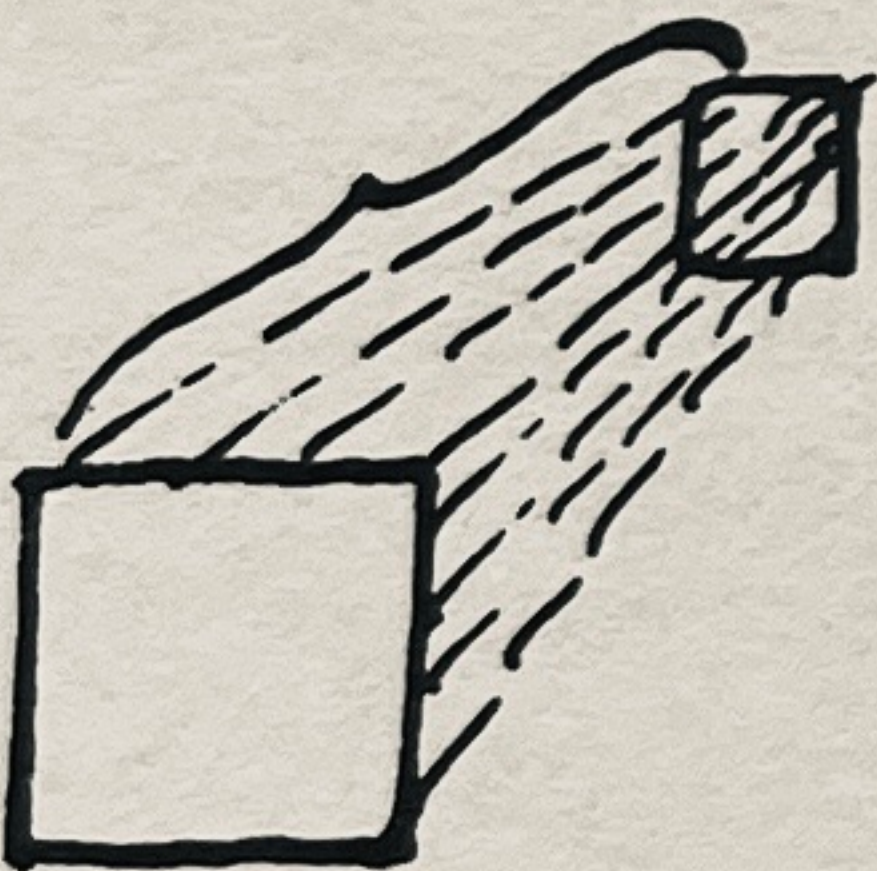
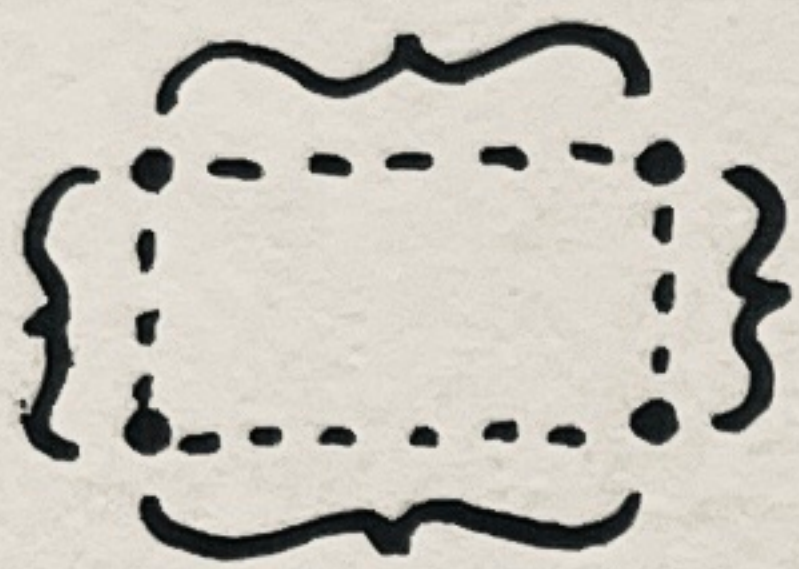
So it is with two planes. If they stand in a visible relation such that we are forced to think of them together, we supply a series of subjective lines between their borders. If the direction of these lines is diagonal in the spatial direction, we think of space between them.

Planes which are in an overlapped relation show this most clearly, but even if they do not overlap it is possible for them to be evidently related. If, as in the case of the vase and its shadow in our still life, there is an emphasized diagonal relation between them, they will serve as the front and back of a block of space.

Think then of your cylindrical vase as having a front plane and a back plane. Between them is the volume of the cylinder. Then think along the diagonal shadow to the shadow of the vase on the wall. Between the back plane of the vase (which you cannot see, except for the inside of the top edge, but which you know is there) and the shadow on the wall there is an evident visual relation, a tension.

When a drawing is so arranged as to make the observer sense this relation, he will experience a mental realization of space in the picture. The back of the vase will be the front plane of the block of space, and the shadow on the wall will be the back plane of the block of space.

You see, then, that your business now is to discover in your still life as many shapes as possible, which you may be able to relate in such a way that tensions will be felt between them. Thus you will bring this flat surface to life. The observer will be able to think his way from the front to the back of the volumes, and of the blocks of space between them. You may find such shapes where you need them, or you may have to supply some of them by emphasizing part of a surface or changing the directions of lines. Remember that you possess the right to this freedom, just as an author may re-arrange words to improve his meaning.



Of course there will be subjective lines set up horizontally and vertically too, between parts of forms which are in this evident relation. If we emphasize these we shall create the effect of flat pattern.

A good drawing balances the subjective depth against the subjective pattern.

Do not be discouraged if all of this sounds a bit difficult at present. It is important that you begin early to think in these terms about the things you draw, not that you achieve perfection in their expression immediately. It is enough to get a few planes and parts in the right relation at first.

You will be able to tell when you have achieved this, for almost magically the realization of space will appear in your drawing between two planes which are in the right relation. Move the chief blocked-out planes around in relation to each other until the best possible space effect is obtained.

Don't worry about keeping the exact visual pattern of your subject. The most important thing about two planes at this stage in your study is their space effect. Don't mind changing the pattern a bit in order to achieve this. Don't worry about details. Keep working in blocked outline until you get a good space effect.

Turn in the diagrammatic blocked-in drawing of your still life, and several of the thumbnail sketches which have led up to it. These should be done in pencil.

In our next lesson the details of still life will be studied.



Part I · Assignment 12

Introduction. Conditioning Instead of Distortion

You have blocked out your still life, and presumably have tried out the idea of tension between related planes, in many sketches.

When you work with a single object, you concern yourself with what happens within the closed borders of that object; but when the object is placed within a format, the lines or planes which delineate the shape of the object will be influenced by the lines of the format. When there are other objects within the format, they too exert their influence upon the particular object. The form of each object and its meaning, is subordinate to the context of the whole. Each surface represented really serves two purposes. It marks the beginning of a volume and the end of a space. There are blocks of space between objects, as well as blocks of solid material making them up. Both must be brought to expression--emphasized so the observer can sense them--in a good drawing. One must not consider the objects as isolated, either singly or as groups. All must be considered together, as parts of a unified, whole composition. The parts must be modified in the interests of the space and pattern effects of the whole composition. When artists have done this obviously, they have been accused of "distortion," that is, twisting objects out of the shape they ought to be. But when we make changes to put an object into the shape it ought to be to take its proper place in the unity of the picture, it is not distortion. We will call such changes by a positive instead of a negative term. When we put an object into shape to play its part in a picture we will call it conditioning. There can be form-conditioning, texture and color conditioning. Conditioning has been practiced, consciously or unconsciously, by every artist of every time. It is selective emphasis. Different artists will condition forms in different ways according to their purposes. No two will ever see them quite alike.

Without the freedom to move parts of objects in relation to each other and to parts of other objects, the draftsman and painter may as well use a camera.

It is precisely here that most of the confusion about drawing and painting arises. We think, somehow, that "the camera cannot lie." Any good photographer will tell you that it takes a great deal of knowledge to keep it from lying.

Photography vs. Painting?

People sometimes think that drawing is simply an old fashioned way of doing by hand what a photographer can do much more efficiently, by a little pressure on the button of a machine. The truth is that, although a few of the things which artists have done may now be accomplished efficiently by a skilled photographer, most of the things which artists can do still lie beyond the reach of the camera.

Photography can only copy an existing pattern of light and dark or color. Of course there is "retouching"--but that falls in the domain of drawing and painting, and often produces results which are neither good drawing nor good photography. If a photograph is to lay claim to being art, some artist must arrange actual objects in such a way that they will create the desired effect in the camera. The good photographer must have a mental image of the picture he is working for, just as must the draftsman, and he must arrange objects in light to this end. It is for this reason that many photographers have studied drawing and painting.

When we understand the mechanical limitation of camera work, we begin to see how foolish it is to judge the excellence of a drawing by comparing it with a photograph of the subject matter, or indeed to think of drawing and photography as competing with each other at all.

Of course, you will hear something of the occasional claims made by artists against photographers, and vice versa, as to the art quality of their respective productions. Each art justifies its existence because, as a language of expression, it is able to say things which no other art can say as well. This is as true of photography as it is of painting, and there would be no rivalry between them if each left to the other the things the other could do best.

Can you photograph an idea which you have in your mind? Can you re-arrange the parts of this idea until they give you the desired effect, and select and emphasize parts of your imagined picture easily, with a camera? You can not, at least with any photographic equipment which is within the reach of the amateur, and not very easily or freely with all the equipment in Hollywood.

Where the painter quickly erases a line, or scrapes off a bit of paint, the photographer must re-stage his entire scene, build new settings, change costumes and makeup, and move lighting equipment. However great an artist the photographer may be, it is impossible for him to exercise the degree of mastery over his necessarily complex equipment which may be exercised by the trained draftsman and painter over his few instruments.

The personality of the artist expresses itself in every detail of the technical handling of a drawing or painting. And since his own trained imagination is his stage, the physical difficulties of creation lie only in the handling of a few comparatively simple, well-known and traditional tools.

Still Life (cont.)

Coming back to the still life before us, we realize that we must justify the use of the freely expressive medium of drawing by taking full advantage of all the things it can do. We should not be satisfied merely to record the accidents of light and shade which are there.

Precisely to the degree that our drawing imitates a photograph it is a bad drawing, for this means that we have artificially limited ourselves to mechanical considerations, which are not necessary parts of drawing or painting at all.

In Assignment 11 we blocked out the objects making up our still life, and planned the larger relations, the tensions, spatial, horizontal and vertical. Now we may go into the more intimate development of the individual forms and surfaces.

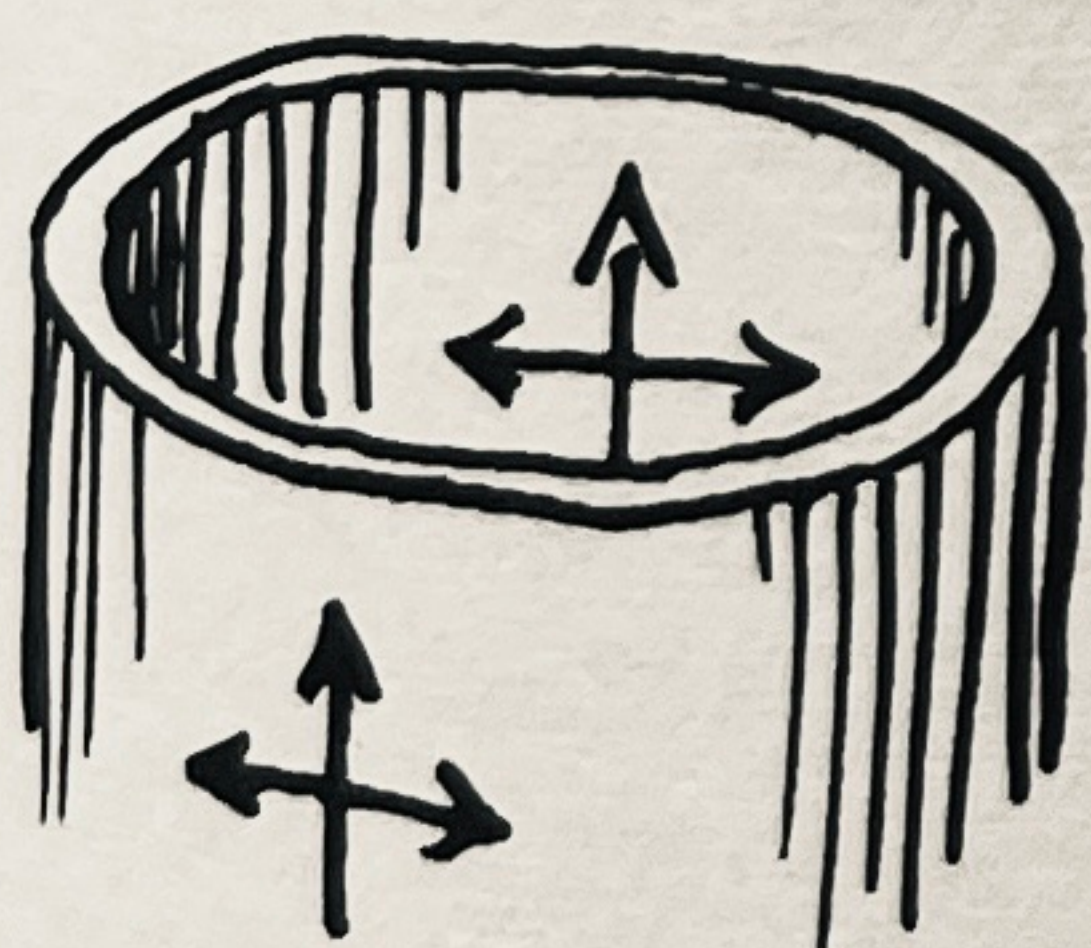
We are looking into the top of the vase. How about the space within the cylinder? Does it look as though the top were solid, or is a front-to-back tension operative there? Much will depend upon how you have treated the plane of light on the inside of the back of the vase, with relation to the front plane of the vase. These two planes must convey the idea of overlapping.

There is also the left hand inside part of the vase top. Here we should insure a diagonal space movement by special attention to the shape of the shadow there. This should also stand in a tensile relation to the outside right hand part of the top of the vase.

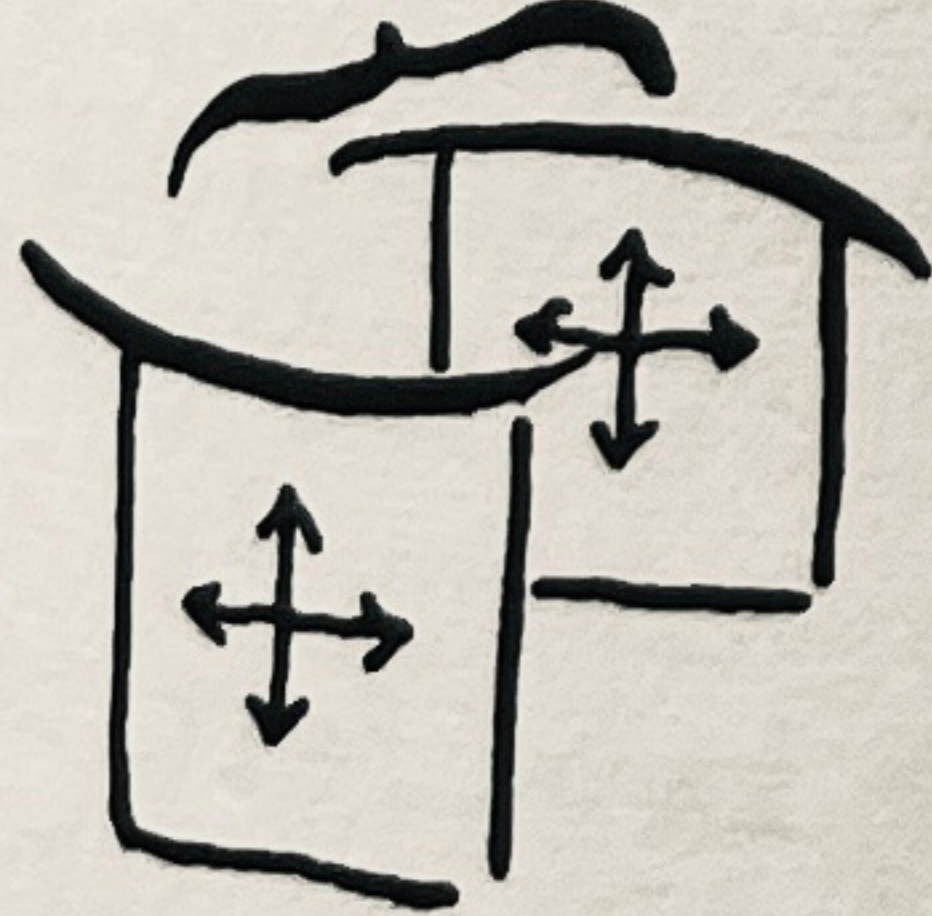
The surface of our cylindrical vase is shiny, so it will doubtless appear to be cut up by many sharp, mirror-like reflections. You may even see a distorted, moving image which turns out to be yourself.

We are in no way obligated to record all of these inconsequences. We need only such planes of light as will build our space and volume for us, and perhaps characterize its surface, so that we will know it is shiny. Some of the planes may be found interesting and useful as elements in the all-over pattern of the two-dimensional decorative effect of the picture, and will reaffirm the verticals and horizontals of the format. Others will be found useful in space-building between objects and in volume-building through and around objects. The ideal situation is one in which a plane can be made to fulfill all of these functions at once.

A drawing in which this occurs will appear simple, but in reality will be a solution of many complex compositional relationships. Planes and lines performing this double duty may be found in all classic masterpieces. They may carry out a line of the background, or relate in some fortunate way with another plane or another object. There are so many possibilities of this sort that every artist who might draw our still life could choose differently and still make a good drawing.



Tension



There are, in fact, as many possible solutions of our problem as there are artists who can see them. Each artist would emphasize the phase or aspect which seemed to him the most important. One man would be enamoured of the sparkle of the light, and would draw or paint as if in splashes of light, more or less ignoring the sharp outlines of the vase. According to contemporary art terminology, he would be an Impressionist.

Another would insist on the beauty of the related volumes, and would reduce everything to a kind of emotionalized geometry. He would be dubbed a Cubist.

Yet another would let his fancy roam, and paint not only the subject matter before him, but also paint into the picture those things which it called up in his mind, however incongruous they might seem to the ordinary observer. These might be the things of which he was reminded because they contrasted with the subject, or because they related to the subject. He might find a draw, for instance, a figure imprisoned in the reflections of the vase. He would probably be called a Super-realist.

Any one of these men, coming back to the same subject at a later time, might see it in a different way; we might have several interpretations of the same subject by one artist.

The moral of all this is that there is no one right way in which this drawing should be done. Every student should do it a little differently, depending upon his own vision and capacities and preferences. It is largely in the differences between drawings and paintings that their value lies. It would surely be very tiresome if all artists saw things just alike.

For mechanical, scientific, or working drawings, of course, the forms must be expressed in accordance with a rigid formula, so that all the workers in a profession can read them easily. No such formula exists for drawings and paintings in the freer realm of contemporary art. Still every artist you meet will try to fix his own formula upon you. Since he sees things in a certain way, he is often convinced that his is the only possible or reasonable way.

For purposes of instruction, it is sometimes necessary for a student to follow fairly closely the methods of some one artist, even though at times he may feel that he would do things a bit differently if he were on his own. Such a student may feel that he is apt to "lose his individuality" by submitting to such a discipline.

This may be true if the teacher is a very bad one, and too rigid in his discipline, or if the individuality of the student is so weak that it could never re-assert itself; but in the great majority of cases, the student needs several years of such discipline before he is able to stand alone.

After a period of training, the student's individuality will be tempered by experience, and therefore more trustworthy. He will have learned that all of us, as humans, have certain capacities in common, but differ widely in others. And he will know how to found his work on universals.

The method of instruction presented here is based on theories developed from the study of drawing and painting of many periods, in many uses and technics. It emphasizes those qualities which have been found to be commonly necessary in many varied fields of artistic expression. The aim of this instruction is to emphasize fundamentals without hampering individual variety and preference in their use.

One distinguishing quality found in all great art is rhythm. In due time we shall apply its principles to our forms. In the visual arts these rhythmic relations must be expressed in eye language, that is, in terms of light planes.

Drawing and painting deal primarily with shapes. But most schools of art have felt that space and volume were such an intimate part of the process of seeing that they must be taken into account and treated consistently in any fully satisfying picture. Even though the aim of the artist might be to paint a picture which is quite flat, the eye is so insistent upon seeing space that accidental and disorganizing space-illusions will creep into the drawing of the artist who does not know how to deal with space effects in an orderly way.

For these reasons the criticism of your work in this course will be conducted on the basis of the order of elements listed below, and the various steps of the creation of a drawing given relative importance in this order.

Rhythm: Although you have not yet learned much about visual rhythm, you have a feeling for it as part of your subconscious natural equipment. As your skill as a draftsman increases, this will become more and more apparent in the way you work.

For the present you will be criticized under this heading only on such matters as the placing of your drawing on the sheet, and the orderly layout of your problems; for rhythm is a kind of order. Try to place your drawings and the parts of them so that they seem neither crowded in places, nor lost in great expanses of paper space.

The most effective expression is rhythmic expression. You will soon be given more information upon this subject.

Space and volume relations: During Part I of this course the chief emphasis is upon the successful expression of individual volumes in space. It will be assumed that each drawing has been placed with intention in a certain kind of space: left below, left above, right below, right above, or a combination of these. Indicate clearly the space movement with which you are concerned in a given drawing, so that you may be criticized as to your success or failure in achieving this space effect. The general space movement is a first consideration.

Relation of volumes to each other: Second only to the main space movement of the picture comes the twisting and turning and tipping of the volumes within the space movement. If they are active in such a way that they are not evidently related to any spatial scheme, then the picture has no unity. It is said to "fall apart" as a composition. If the volumes do not have any effect of movement at all, the picture will lack interest and animation. It will be too static.

We use the term dynamic in referring to a drawing which has strongly contrasted and yet inter-related inner movements. A picture which is made up largely of verticals and horizontals will be on the static side. A picture in which diagonals dominate will be more dynamic. The feeling of the artist about his subject matter often dictates just what the balance between the static and dynamic elements will be. He must decide whether he wishes to express quietness or activity.

Relation of light planes to each other: In the final analysis, the individual light plane is the brick out of which our pictorial structure is built. The picture is a series of areas of certain shapes which reflect more or less light from the surface of the paper to the eye. Of course, if it is an outline drawing, only the shapes of the planes will count in the expression.

Do these planes seem outlined in a helter-skelter way, or do they combine to form volumes and spaces by virtue of the planned tensile relations between them? Do their outlines express texture? If the drawing includes values, do the values as used convey the surface texture? Is there evidence that the darks and lights are merely copied accidents? Or do the darks and lights appear to have been chosen with the intention of emphasizing important planes?

Technical clarity: Even though you may work in a slow, painstaking way, you can avoid fumbling and blurring your intention. Be positive, even if you are mistaken; in this way you will soon get positive correction. Don't be over-timid about making your lines and spots of paint say what you want them to say.

In this way you will arrive soonest at truly spontaneous expression. This is a combination of certainty of intention and skill of execution which characterize the work of a real master in a given medium. It is as though his mind were far ahead of his hand, and his hand was forced to skip and dance and leave out all but the absolutely necessary strokes in order to keep up with it.

A certain sort of studied spontaneity may be achieved by doing the same drawing over and over again until it can be "dashed off." But this spontaneity, although better than none, is not valued so highly as an art quality as is the evidence of a first and successful attack upon a problem.

It will be observed that many contemporary paintings are spontaneous enough, and give a first impression of skill and mastery, which unhappily is not borne out by more penetrating observation. Many others are very carefully done and give the impression of great clarity of expression; but when one looks further for volume dynamics or space order these qualities are lacking, and the painting remains spatially inert.

Exercise (a).

Make two still life drawings such as have been described, one in line and the other in monochrome watercolor value. Do not concern yourself too much with texture and surface quality, but concentrate upon rhythm, space order, volume dynamics, and plane relations.

We shall take up rhythmic selection in the next assignment.

Part I • Assignment 13

Introduction

You will inevitably come upon the word abstract in reading anything which has been printed during the last ten years on the subject of art. The word has been used in so many senses that it has almost lost its meaning.

As before noted, to abstract really means to draw out or to take away from. The noun abstraction means something already drawn out or away from. When we select certain aspects of the seen image of a natural form and set them down on our format to the exclusion of others, we are abstracting.

There are, of course, degrees of abstraction. We may select enough of the planes of light as seen to make a rendering which seems quite naturalistic, and yet we may subtly have reorganized the relationships of the planes to conform to a planned structure back of their appearance of accidental naturalism. This degree of abstraction at least has been practiced by all artists whose work has stood the test of time.

When you reduce the appearance of the object before you to an outline in black and white on your paper, the result is, strictly speaking, an abstraction. The old masters drew abstract sketches as basis for paintings which often, when finished, presented a naturalistic appearance to the casual observer.

If you simplify a shape to its geometrical basis, that is, take the squareness as the important thing about a box, the result is an abstraction. If you then become interested in the composition or organization of color planes or line directions for their own sake, if you use your subject matter only as a springboard toward the discovery of rhythmic relations, you are practicing a further degree of abstraction. The unlikeness to natural objects will undoubtedly be remarked by observers of your work, who, if they do not happen to respond to visual rhythm for its own sake, will dislike and ridicule your drawings and paintings, and may use the word abstract as a term of opprobrium. This sort of criticism is usually based upon lack of knowledge.

There is a still further degree of abstraction, where the artist works with shapes for their own sakes. He does not directly observe any subject matter at all, but "creates" arrangements of shapes which he does not intend to be reminiscent of anything actual. This kind of art may be compared to a song without words. Its aims are purely lyrical. It is a song which appeals to the eye instead of the ear.

Of course, this sort of drawing and painting also must inevitably be based on previous experience with the visible aspects of nature. The artist can re-combine only the quantities and qualities with which he has had previous visual experience. The notes of his scale are the same as those of the artist who works more closely from nature. In most systems of art training--even those which emphasize purely lyric work as the final aim of the student--observation and analysis of natural forms and appearances is encouraged. "Free expression" is not possible without previous discipline. Knowledge alone makes us free.

In your work here you will be encouraged to observe nature on the one hand, and to apply selection and emphasis according to the purpose of your drawing on the other.

Some of your work will appear abstract and some will not. The quality of abstractness in itself is neither bad nor good. It is simply an inevitable part of personal art expression. To follow any given style involves a degree of abstraction, whether you borrow the style of someone else or evolve one of your own.

Rhythm

Rhythm has been defined in so many ways that its meaning to the student of drawing is necessarily vague. "Regular, harmonious beat or cadence," "harmonious relation of parts" are ideas given us by the dictionary.

Just as some people, without conscious training, walk more rhythmically and gracefully

than others, some draftsmen will draw more rhythmically than others. But it is possible to develop the sense of rhythm by training.

Why is rhythm important in art expression? Because the message which the artist has to convey, if expressed rhythmically, moves into the observer's mind with less opposition; and because rhythm in itself is a source of pleasure. There is the paradox of the picture which contains tragic, perhaps ugly, subject matter, but which is presented so beautifully, so rhythmically, that one cannot avoid enjoying it.

A degree of rhythm is necessary for the successful expression of any ideas at all.

Rhythmic Relations

Even in the most "commercial" forms of art, the laws of design--which are simply the laws of rhythm as perceived through the eye--are used to "put over" the advertising "message." Specialists in the field of composing commercial rhythmic arrangements are called layout men. Such layouts are largely shallow arrangements in two dimensions, simple enough so that even an untrained rhythmic sense will respond to them.

On the other hand, the rhythmic structures of great paintings are often so complex that the observer continues to discover new beauties in them over a period of years. In this manner some works of art which were done centuries ago, based on subject matter which we no longer know, retain their vitality and freshness, and are artistically as interesting as any done today.

The question may arise, "Why can't I simply copy nature? Nature is rhythmic, and in this way I shall inevitably get rhythm into my drawings." The difficulty is that the rhythms of nature are so infinitely complex that we seldom see the completion of any one rhythm. We must deal in rhythms which the eye can perceive, and we must express them within the limits of the rhythms possible to our chosen artistic medium. This is a process of translation from natural to pictorial terms, and a successful translation must be idiomatic. We must work within the possible rhythms of our format.

We are not dealing with infinite space, but with space limited by the frame of the picture. We are working with lines and spots which stand for planes in that space. How may we arrange them in a rhythmic manner? How may we get the effects of "beats and cadences," of "harmonious relation" of parts?

Harmony means "agreement in relation; conformity, order, symmetry, unity." Things which are harmonious must show evidence of agreeing, of having something in common.

In terms of spots and lines, certain kinds of agreement are possible. There may be direction agreements: lines parallel with each other, concentric, or converging to a common point. There may be thickness and length agreements. Among planes there may be size, shape, and value agreements, and agreements in subjective lines formed between planes by tensions.

When is a drawing orderly? It is orderly when the number of agreements between the elements in it is evidently greater than the number of non-agreements--when we are visually conscious of the preponderance of agreement.

Exercise (a).

In the previous assignment you blocked out your still life drawings with an eye mainly to space order.

Set up another still life, or find an assemblage of objects already so placed as to be suitable for still life study.

First, make a thumbnail sketch study for space order and volume relation.

Second, make a full size drawing in outline, in which you have changed the parts of the first drawing a little, the change being in the direction of the agreements above mentioned. Make planes which should relate for better rhythm more obviously related by changing their size or shape, or by shifting them into subjective linear relations where they parallel other important lines.

Move them so that they seem to express the repetition of some unit of size in volume or in space. For instance, let the space between the wall and the object be planned so as to repeat the depth of the object two, three, four, or five times exactly.

Exercise (b).

Using the full size outline drawing of Exercise (a), as a basis, study the relation of surface planes in dark and light. Can you reduce irregular gradations to more regular ones without losing the character of the object?

Break these gradations up into a series of value steps, either in planes of equal width, or in a cadence of widths, as a one, two, four relationship. Work with such planes over all the plastic surfaces of your still life until you have co-ordinated them with the earlier planned space rhythm and pattern rhythm.

Execute this drawing in monochrome wash. Let your value steps be rhythmic intervals--let the amount of dark-light change be in orderly steps.

Exercise (c).

Now attempt a very simple still life, working directly with the brush and in five values of grey, without any previous sketches. Try to do all the planning in your head.

Aim at a degree of spontaneity in your expression, which you can achieve, you will remember, only by knowing so precisely what you want to do in advance that your hand will execute it without faltering.

After you have done what you can with the brush, accent by the use of your pencil on the same drawing.

Part I · Assignment 14

In your first work with still life you will naturally tend to magnify the importance of individual objects, rather than consider them as a group. Drawing one object alone, without regard to the effect of the format, and with emphasis on space effects rather than layout or pattern effects is really very like the approach of the sculptor to his block. Such drawing has been called sculptural drawing to distinguish it from drawing in which planes and lines are chosen in the interest of the whole group unity in relation to the picture plane. Since our understanding of unity, or oneness, or totality of effect begins with the single object, this course has introduced you to drawing by this road.

It is quite possible that at first you will be a little bewildered in your attempts at drawing group unities. You may feel that you did not do very well in the part of the last assignment in which you were asked to draw shapes in relation. It is too early to expect very fine results or much confident spontaneity in this kind of drawing, but it is not too early for you to begin thinking that way about objects: in groups, not as separate things.

You should continue your study of individual objects, realizing as you study them separately, that they may be somewhat differently drawn when drawn in relation to other objects and to the picture plane in a composition. From now on you should attempt composition sketches from time to time. From the very first simple layout of the parts of the line practice assignment through each successive lesson your attention has been directed again and again to the importance of composition, to the fact that forms only exist in relation to each other, and that when you change these relations you change the visual effect of the forms themselves.

Composition

To compose is to place together. This is the term applied to any artistic process of construction, where elements are combined to make a whole. The less obvious part of this process is the reshaping of the elements themselves, which must occur when they are placed in a new relationship. It is not enough merely to place them together unchanged, for then they will not seem to belong together. They will have the effect of inconsistency, of not being a part of the context in which they find themselves.

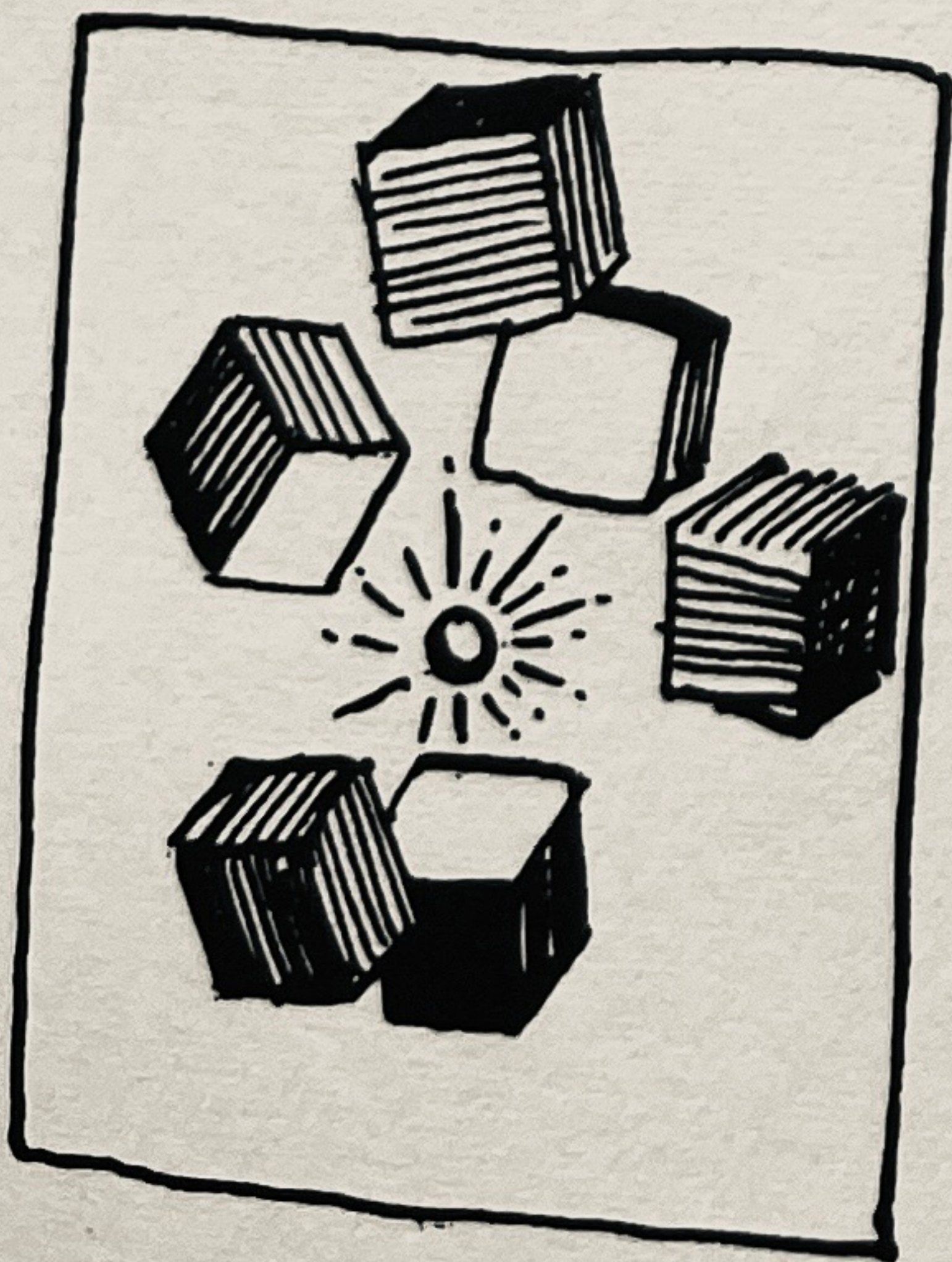
A kind of fitting and trimming and cutting goes on in the process of making a composition and developing its rhythm. First of all, the objects must be tried in various relations--a little more space here and a little less there--considered as space as well as in pattern. Then their individual twisting parts, whether volumes or planes, must be considered, and modified or emphasized in the interest of dynamic unity.

Subjective lines caused by tensions are the magnet-like forces holding the planes of the composition together, as gravity holds the planets around the sun.

We have spoken of rhythm as being the result of regular, harmonious beats or cadences, or harmonious relations of parts. In music these exist in time, but what path does this suggested sequence or progression take in a picture?

It is useful to consider the objects and planes of a picture as members of a sort of planetary system, in which all the volumes rotate around a middle point. The middle point of a pictorial planetary system need not be an actual object or part of an object. It is simply a point in space at the optical center of the format. About it we arrange planes which delimit volumes or spaces, as the case may be. Spaces may balance volumes, or volumes balance volumes, across this middle point. Planes stand between volumes and spaces.

If we have considered the spaces as being just as real as the volumes, and have treated them as real parts of the composition, we will find ourselves slowly gaining an understanding of the sort of fitting and cutting and conditioning of objects which must go on in the process of making a unified composition. The middle point is the center of this unified single form, made up of empty parts and full parts.





Each plane of a given volume is in a balanced position, because on one side it owes its exact place in the picture to the pressure of the forces of space upon it, balanced on the other side by the forces within the volume itself. (Review Assignment 11 on the subject of tension.) There is just one inevitably right place for that plane in a given composition after the larger matters of space order have been determined.

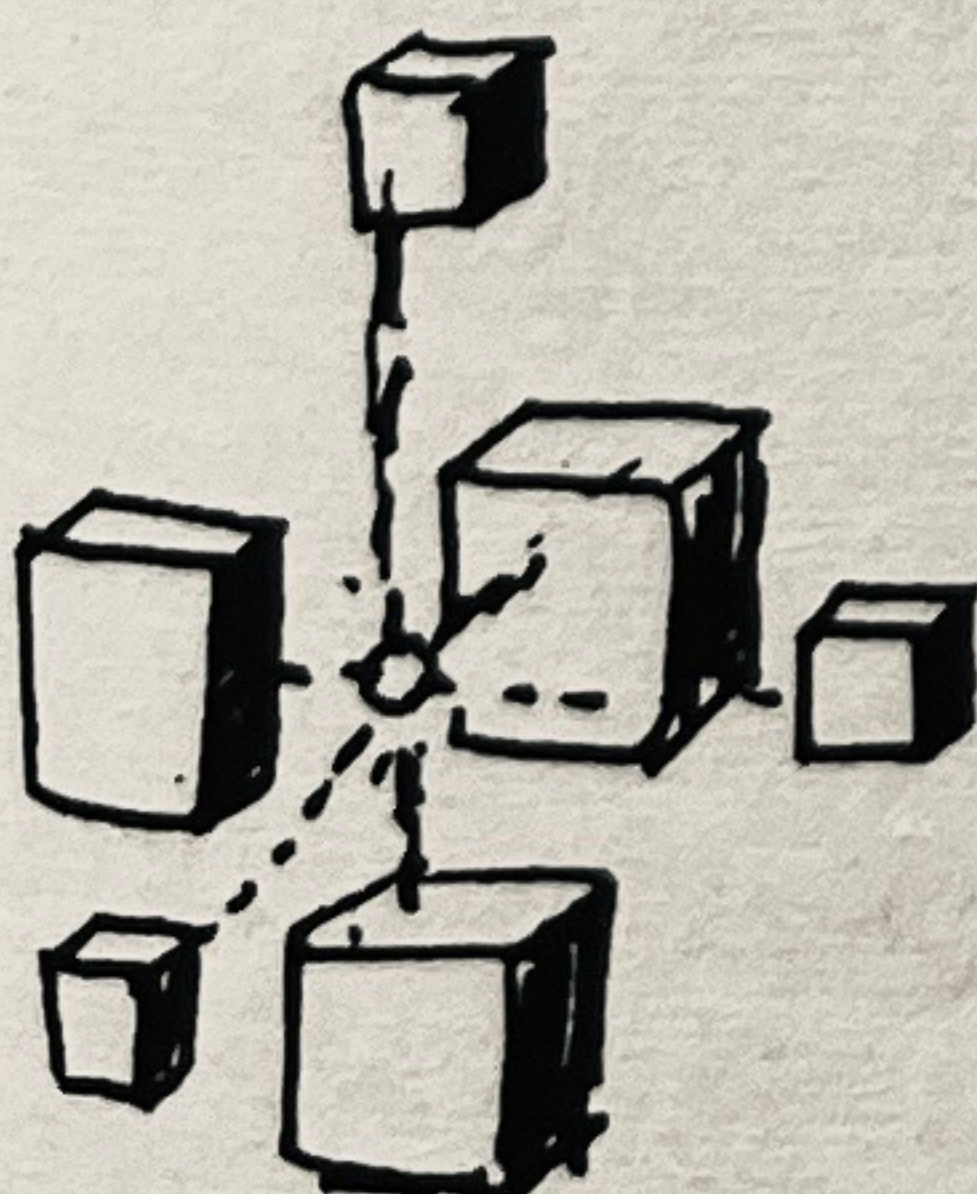
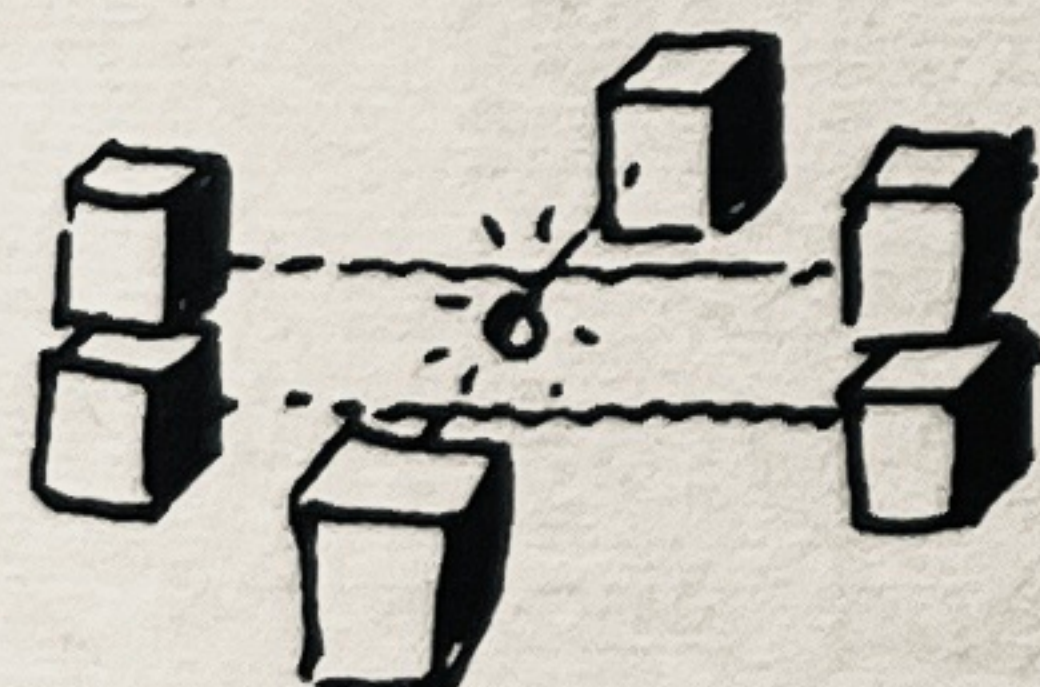
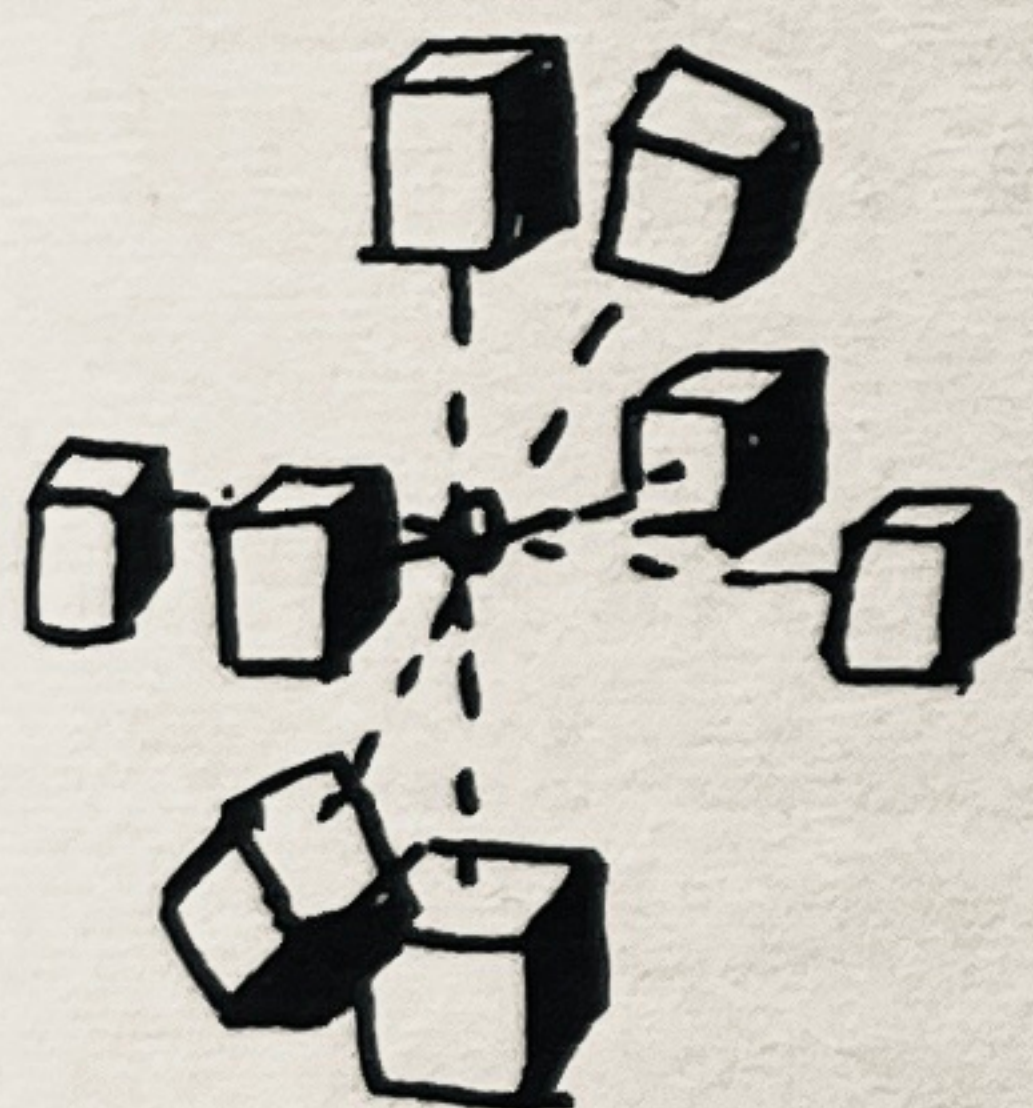
If you will consider the whole composition and the interrelation of tensile forces, you will be able to place it there. If you are still unable to think any further than the borders of a single object, you will not be able to do this except by accident.

In a well-composed picture, the whole is more than a mere adding up of parts. The effect is due, not to an accumulation of compositional elements, but to the establishment of visibly-felt bonds between them.

You may have seen so-called abstract pictures in which lines and planes appear which do not seem to represent the surface or edge of any given object. Here the artist is bringing to visible expression the relationships between the parts, relationships as real to him as are the objects themselves. He actually draws into his picture lines and planes which another artist might express only by arranging the parts of his composition so that you would feel the relationships, as you feel the subjective line between two points.

Your work now should take two paths. You should study intimately the construction and surface character of individual, isolated objects of all kinds. These will be form-studies or sketches, not pretending to be complete compositions, and hence not complete works of art.

From time to time, when you feel adventurous and rather sure of yourself, you should attempt the larger task of composition. This should be understood as a problem at once of two dimensions, or layout, or pattern, and of three dimensions, or depth in space. The balance across the middle point must be kept in pattern as in space.



In these you may first practice balancing simple shapes as in these diagrams, but sooner or later you should deal with objects and the spaces between them, forcing yourself to conceive of them as a unified whole and to express this unified whole under the conditions imposed by the shape of the format. The balance of all the parts of the picture in three dimensions should be your chief concern.

This lesson will suggest a number of possibilities for studies, as well as compositions in still life. Choose among them according to your inclinations and the material you have at hand, but realize that these assignments cannot take you the whole way. It is not enough merely to turn in the required work. By now your sketch book should be your constant companion.

Sketch Materials

A sketch book should represent a compromise between the artist's desire for convenience and his need for constant study. It should suit the kind of work he wishes to do. If your sketch book is so cumbersome that you find yourself continually leaving it behind when you might have it with you, it is a bad sketch book for outdoor study, even though it may have very nice paper in it, and a nice stiff cover to act as a drawing board, and be very good for work in a home or studio.

The medium you use should also be chosen for convenience. You might like to sketch with your fountain pen, or with a soft pencil, or with a black crayon. If it is something which is messy and rubs too easily you will find yourself neglecting your outdoor sketching.

In your choice of medium, remember that outdoor sketching conditions away from the work-room seldom allow much correction and going over. Hence you may use comparatively cheap paper which need not stand erasure, and a medium which does not allow changes. Make another sketch instead of erasing.

If you intend to make larger drawings from your sketches, the use of quadrille marked pads will be convenient. Artists often use pads of this sort which will take pen and ink, about five by seven inches in size, or even smaller. These are sold in ordinary stationery stores, not art stores. The vertical and horizontal lines act as guides, and help you to keep your sketch in order. When it comes to enlarging, you may line off your big sheet in corresponding larger squares, and this helps tremendously in keeping the same relative proportions in the full size drawing.

Corrections in sketches may often be made in another color--blue pencil, say--without stopping to erase the first lines. Or if you make the first lines very light, heavier ones can be set down firmly when you come to more definite conclusions.

When you sketch, remind yourself that you are going to have to leave out a great deal, so decide before hand just what the important things are for you, and try to get them down before your subject gets away from you.

Practice simple blocking-in most of the time. A line or two will suggest a gesture or movement. Try to get the feeling of what you are drawing into a few lines. What you leave out will be as important as what you leave in; suggestion will often be better than painstaking drawing. (Read again Assignment 12 on spontaneity.)

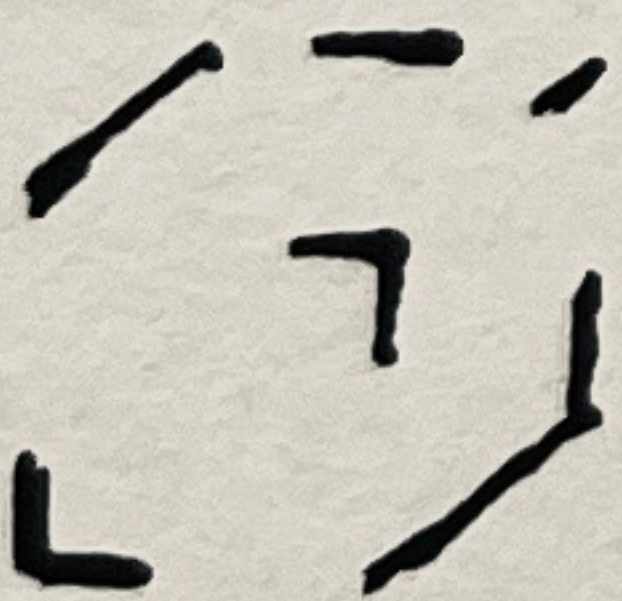
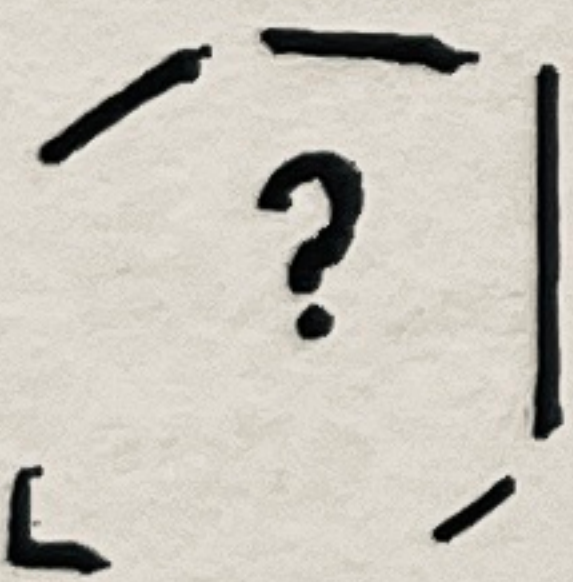
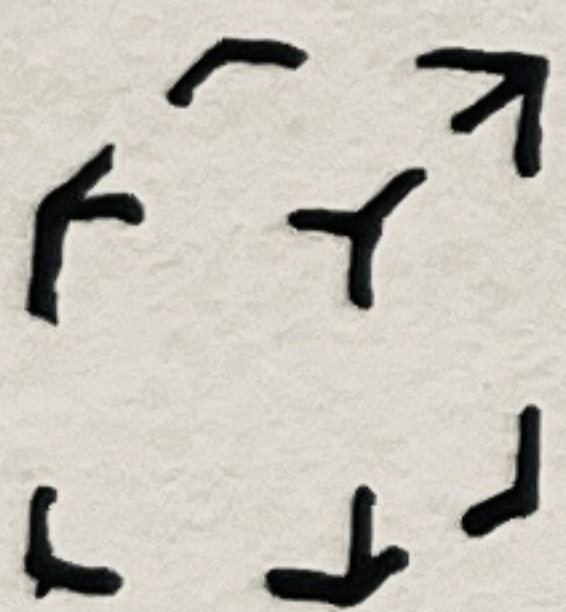
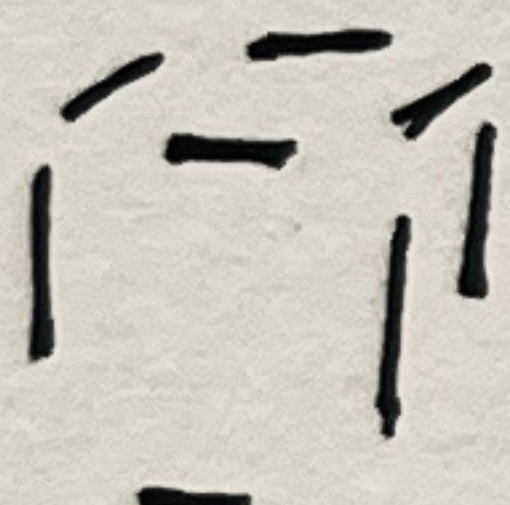
It will be impossible to tell you just what to put in and what to leave out to make a successful sketch. But in general it may be pointed out that there are certain significant parts of the outline of any form which must be set down if the form is to be expressed at all. If they are in the drawing, they will create the necessary subjective lines, so that the observer looking at the sketch may complete the form in his own mind.

There is a feeling of partaking in the artist's creative adventure in looking at a good quick sketch. The observer enjoys catching the suggestions and re-creating the form mentally. This is one of the reasons why so much emphasis is placed upon spontaneous work, and why a good spontaneous drawing will always get more attention than a good painstaking one.

In sketching you must choose, then, a definite aspect of your subject, and put down the idea quickly with as few lines and spots as possible. Never draw a full length line when part of it will do. One line or spot too many will seem to call for further finish elsewhere, and the first thing you know you will have lost your original idea, the cause of doing the sketch, in a welter of conflicting interests.

A sketch should be a one-idea drawing, dashed down before the idea escapes you. Most of your sketches will be important only because of the practice they provide, but occasionally you will bring one off, with a few dashing lines, which will amaze you with the completeness of its effect.

No artist expects every sketch to be a masterpiece, but a succession of sketches may build up to a great work of art. Most great works are compounded from many sketches, either those made specifically as beginning studies for the painting, or drawings which indirectly and subconsciously have contributed to the perfection of an idea. Sketches are usually not to be considered as perfected things in themselves, but as parts of the process and progress toward finished work.



Exercise (a).

(1) Suggestions for study in form:

Any drapery, the form of which is not confused by too much pattern. Thick, heavy materials will be simplest.

Kitchen implements; garden, carpenter's or metal-worker's hand tools.

Hats, shoes, dressing table fixtures.

Fruits, seeds, flowers, twigs. Draw a twig near at hand to study leaf structure, and then far away to see its whole shape.

These may be slow, thoughtful studies, not quick sketches.

(2) Suggestions for study in texture:

Rocks, Rough and smooth drapery. Foliage of trees. Grass.

Various wood grains. Bark. Rough concrete. Gravel, sand. Rain-washed soil, plowed soil.

Shiny things like glass and crockery.

The surfaces of vegetables, as squash, cabbage.

Exercise (b).

Suggestions for quick sketching:

Any figure on the street which seems to be about to stand still long enough for you to get anything down.

Men at work or play. People sitting on street cars, in railway stations, parks, cafes, etc.

The zoo.

The barnyard; implements, animals, work going on.

Architectural details; fire hydrants, lamp posts.

Building construction; wheel barrows, lumber, etc.

Boats; their shapes and the details of their fittings.

Dancers and actors, particularly those in costume, striking a pose or gesturing widely. Public speakers, Singers. Orators.

Figure drawing is best begun by the quick sketch method, for you are forced to work at the whole figure at once. If you approach it through slow study, you will at first get lost in the great number of parts and details.

Keep to simple forms for quite a while in your slow study work, but try anything in your quick sketch work, and don't worry if you get only occasional good results. Fluency is what you are striving for and will get if you keep this up.

Exercise (c).

Suggestions for compositions:

For the present stay with subjects which are still, and before you. They may be large or small, but they had better be under controlled light and not involve too much depth.

Furniture about the fireplace. A doorway.

A closet door open with clothing on hangers.

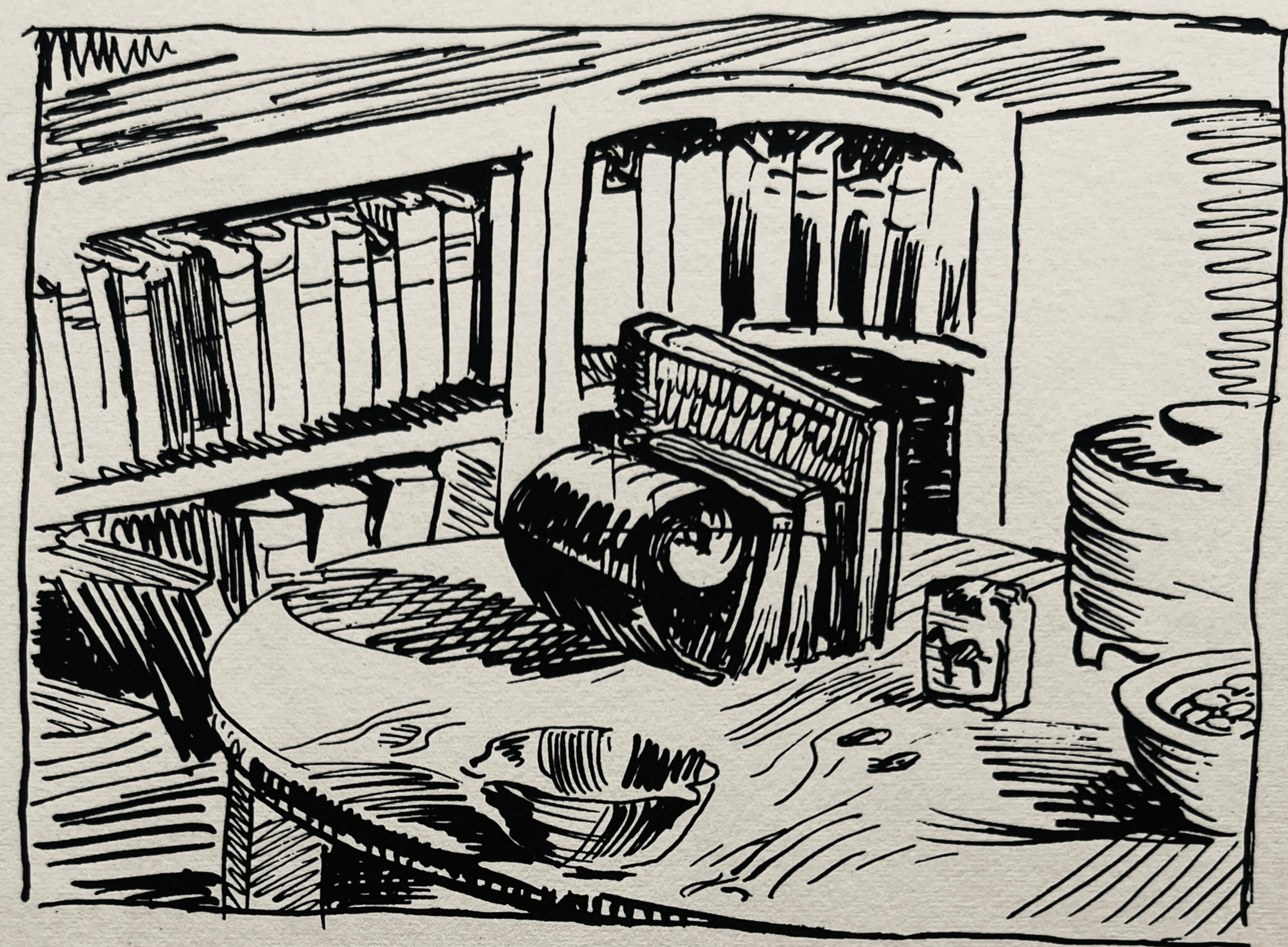
A dinner table set, before or after dinner.

A bedroom with unmade bed. The top of the dressing table after things have been used.

The kitchen stove with pots and pans on it, and the surroundings.

You are responsible for background, foreground, and surroundings, in all compositions.

For this assignment turn in two sketches, two studies, and one composition in pencil and watercolor combined; but do not turn in the first ones you make!



A Quick Sketch

Part I • Assignment 15

Summary and Bibliography

If you have honestly and thoughtfully practiced each of the foregoing assignments, you will have, by now, the ability to look at a subject, reduce it to its simplest elements, and draw those elements in a three-dimensional way on a two-dimensional format. There is no subject so complicated that with patience you cannot build it up out of the simple forms you have learned.

However, you will not be able to carry this through so long as each separate element gives you difficulty. Daily practice on progressively more complex problems is the only way to an easy, fluent style. Execution of simple forms must become so much a matter of habit that you do these things almost automatically, meanwhile giving your chief attention to the whole effect and purpose of your composition.

Like a pianist, you must not only know where the keys are, but you must be able to combine and control many of them at a time, without looking at the keyboard or worrying about the whereabouts of a particular note. You should expect real fluency to develop only after you have such mastery of the elements of drawing that you are able to create forms on paper as easily as you form words with your mouth and throat.

Habits are formed by repetition. You have been furnished with the scales and chords out of which drawing is built. Practice with them, at first on simple individual objects, then more complex ones, then simple groups of objects and finally complex groups of objects. If you lose your way in a drawing, go back to the beginning again. If something goes wrong in a drawing, this means that you have insufficient command of the elements which make it up.

From now on, without further mention, it will be assumed that you have formed the sketch book habit; that between specific assignments you are continually practicing all sorts of combinations of the elements which have been explained to you.

Forthcoming lessons will be concerned largely with the special problems which arise in the application of drawing principles to certain kinds of subject matter, or to the kind of drawing which has a specific purpose. Each of the lessons will be built upon the basic elementary theories of Part I.

The differences between the kinds of drawing which are used for specific purposes are mainly a matter of special emphasis. For instance, in drawing for scientific purposes a detailed description of the shape and surface of a form may be all that is desired. The form is therefore treated as though it were entirely isolated, so that rhythmic relationships between it and other forms enter into the matter only so far as they affect the successful layout of a page. Again, in architectural rendering the formulae of linear perspective have usually been accepted as the convention, and other concerns of composition subordinated to them. Newer types of architectural renderings, however, tend more and more to adopt the idiom of the modern composer of paintings.

The study of figure drawing brings up its own special problems in which a knowledge of anatomy plays its part. Portrait drawing and painting demands an even more specialized technique. The particular sort of figure drawing known as cartooning also has its set of conventions and technical limitations, which will be described.

Landscape drawing brings up its own special set of problems. Here one confronts the difficulties inherent in composition in deep space as contrasted with the comparatively shallow space involved in still life and figure study. The constantly shifting effects of light are confusing until one learns to fix upon one scheme best suited to the purpose of the composition and to adhere to that in spite of changes in appearance due to the accidents of shifting sunlight.

In any such discussion one should of course include drawing for pure "self-expression." In its commoner and less interesting phases this amounts to the half-conscious "doodling" which so often decorates the walls of telephone booths. However, this kind of drawing can be brought to a high degree of excellence.

It will be the aim of future lessons to give the beginner that ground work which will enable him to undertake further study in any of these special fields, with the realization that each has its own conventions and usages, and that the practice of one sort of drawing need not necessarily prejudice him against another.

Bibliography

The art books of one period seldom emphasize the art principles which may seem most important to another and often reflect the passing fads and fancies of drawing and painting rather than the enduring fundamentals. Many books on this living and changing subject go out of date quickly. But there is some published material that retains its value over a long period of time.

Very important to the student are good illustrations of the black and white drawings of recognized masters. Reproductions in color are sometimes valuable, but unless they are very good ones, and hence rather expensive, they should not be trusted as reflecting the true quality of a painter's work. The necessary reduction in size and limitation in the number of colors of printing ink used conspire to blur and lose the actual drawing and brushwork. Unless carefully printed, the color reproduction is apt to vary widely even in the general color effect from the original, and in no cases can the texture of the heavier strokes of paint be properly reproduced.

The student should take every opportunity, therefore, to see works of art at first hand.

Many fine works which were originally carried out in line or black and white are to be found reproduced inexpensively and with considerable fidelity. A number of portfolios are available, issued by various publishers. Among these, the publications of The Studio press are excellent.

Drawings of Raphael, Leonardo da Vinci, Michelangelo and drawings, etchings, and woodcuts by Albrecht Durer, Rembrandt van Rijn; and the lithographs of Honore Daumier are invaluable study material. In these the student may often see a work of art in its beginning stages, as a sketch, whereas the methods of construction are often much concealed in a finished work, and are quite lost in a bad color reproduction.

The books here recommended are widely accepted by schools and colleges as reference material, but of course the list is incomplete, since new books are appearing all the time. Your public library will help you in getting them.

General Art History

Helen Gardner: Art Through the Ages. Widely used college text.

Sheldon Cheney: World History of Art. Better for general reading.

Pijoan: Outline of Art History. A very detailed and scholarly account.

Thomas Craven: Treasury of Art Masterpieces. A history of art in terms of color reproductions as fine as modern printing can produce by this method. Necessarily somewhat limited in scope.

Art Philosophy:

Sheldon Cheney: Primer of Modern Art and Expressionism in Art.

Ralph Pearson: How to Understand Modern Pictures.

Herbert Read: Art Now, Art and Industry, Art and Society.

Publications of the Museum of Modern Art, New York. On many historical and contemporary artists.

Articles in the Magazine of Art, published by the American Federation of Art.

Pictorial Composition

Cezanne's Composition, by Erle Loran, printed by the University of California Press, is a scholarly, up-to-date analysis of the work of the man who is thought to be one of the chief contributors of the age to advancement of knowledge of composition. Cezanne's work is generally considered to be at the basis of most modern movements in art, yet he worked from nature and produced pictures which interpret subject matter. The book here recommended compares photographs of Cezanne's subject matter with his paintings, and illustrates by means of block diagrams what he did in the way of selection and emphasis.

Perspective

Perspective, and its practical application to problems of Graphic Representation by Joseph William Hull, published by University of California Press.

Art Materials and Technic

There is no one book which contains all the information on this subject, but the student will probably find

The Artist's Handbook by Ralph Mayer, published by Viking Press, useful as beginning reading.

Max Doerner: Materials of the Painter, translated by Eugen Neuhaus, published by Harcourt, Brace & Company.

Hilaire Hiler, Technique of the Painter and Painter's Pocket Book, published by Harcourt, Brace & Company, contains many useful formulae.

D. V. Thompson writes most readably and authoritatively on the methods of medieval manuscript illumination and of tempera painting brought up to date, in the Art of Tempera Painting, published by the Oxford Press. The Craftsman's Handbook, a translation of the early Renaissance textbook on painting by Cennino Cennini is equally interesting, as are the other works by this scholar--artist--craftsman.

Any student who is interested in books on a specific art subject may turn in a request for a list of such books with this assignment.

Exercise (a).

Continue the work begun in the previous assignment, but try to find new subject matter which is in some contrast with that used for the drawings last turned in.

Include the following for this assignment:

- (1) Two careful form studies.
- (2) Two texture studies.
- (3) Two quick sketches.
- (4) Two compositions.

For your first assignment of the second part of the course, linear perspective as it applies to picture making will be studied, and you will be introduced to a method of picture analysis which will enable you to study the methods of construction used in the works of art which you may admire.

